# STI 2019

# International Conference on Sustainable Technologies for Industry 4.0



24-25 December 2019

Venue: Permanent Campus, Green University of Bangladesh

Dhaka, Bangladesh













- BBA | MBA | EMBA = LLB | LLM
- CSE | EEE | Textile Engg.
- English | Sociology
- Journalism and Media Communication

### **SPECIAL FEATURES**

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# STI 2019

# **International Conference on Sustainable Technologies for Industry 4.0**



02-07

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Conference Partners and Sponsors

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4th Industrial Revolutions STI 2019 **Main Pillars of Industry 4.0** 

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# **MESSAGE**

Member University Grants Commission of Bangladesh



2019) is going to be held from 24-25 December 2019 at permanent campus of Green University of Bangladesh, Purbachal American City, Rupganj. On this blissful occasion, I would like to express my heartfelt greetings and best wishes to the organizers and sponsors involved with this event. Using technology is not enough for us in the fourth generation industrial revolution. Creativity and sustainable

technology are needed to be emphasized for all of us. The aim of this International Conference is to share scientific, technological as well as engineering knowledge and ideas among the scientists, scholars, industry practitioners and researchers around the globe. I believe that the STI 2019 will play a vital role to disseminate the information of scientific achievements, sustainable and innovative technological and industrial developments in the relevant fields among world-class experts as well as young researchers and academicians.

I congratulate and thank the Faculty of Science and Engineering, Green University of Bangladesh (GUB) for

organizing such an auspicious event. I wish the International Conference on Sustainable Technologies for Industry 4.0 (STI 2019) a grand success.

Prof. Dr. Md. Sazzad Hossain

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**Green University of Bangladesh** 

Industry 4.0

# **MESSAGE**





Major Concerns of Industry 4.0

Industry 4.0 (STI 2019) has been organized by the Faculty of Science and Engineering, Green University of Bangladesh (GUB) during 24-25 December 2019 at lash green permanent campus of the university located in Purbachal American City, Rupganj, Dhaka. As one of the leading private universities in the country, GUB has earned the prestige of holding a research oriented environment in both academic & professional developments. In fourth-generation industrial revolution, the use of technology is not enough for us, innovation and develop-

It is an immense pleasure for me to know that the International Conference on Sustainable Technologies for

ment of sustainable technology is a must, and it's a very timely milestone to achieve for the country. Such a kind of event can be a tremendously effective platform for sharing knowledge and experiences among scholars. Our young generation will get an opportunity of learning new stuffs of cutting-edge technologies from the world-renowned experts. A successful arrangement of such an event may bring name and fame for the GUB To the best of my knowledge, Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML), Big

aided design and manufacturing technologies are the driving forces of fourth industrial revolution. I hope STI 2019 will be the visitants for researchers, industry professionals and practitioners to represent their scientific achievements and sustainable innovative industrial developments in the relevant fields. I pay special thanks to dean, chairpersons, professors, all teachers and staffs of the Faculty of Science & Engi-

Data Processing, Cloud Computing, Smart Grid, Real-Time monitoring and control systems, and computer

neering for taking a challenging footstep to organize such a wonderful conference on a timely topic. I pledge to continue my supports for scholarly events like this. I wish the best for STI 2019 international conference.

Mohammed Abdullah Al-Mamui

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STI 2019 | International Conference on Sustainable Technologies for Industry



# **MESSAGE**





I am delighted to know that, the Faculty of Science and Engineering is going to organize an International Conference on Sustainable Technologies for Industry 4.0 (STI-2019) to be held on 24-25 December 2019. The conference is intended to initiate a hub for presentation and discussion on outcomes of related research results carried out both in industry and academia. It will offer a set of exciting and timely topics in Computer Science and Engineering, Electrical and Electronic Engineering and Textile Engineering and so on. I assume that science and engineering research plan targeting the development of sustainable technologies is a timely I believe that the STI-2019 will be a vibrant and thriving conference. This conference will bring benefits for the

participants academically, technically and in many other ways. It is also understood that this kind of conference will promote collaboration among researchers at home and abroad and create partnerships between academia and industries. I appreciate the organizing chair of STI-2019 and his team, for their tremendous and sustained efforts in organizing and facilitating this conference.

I would like to thank participants for their contributions to make the conference a great success. I would like to express my warm welcome to all the foreign and local guests at the permanent campus of Green University of Bangladesh. I wish all the success of this conference. Long live Green University of Bangladesh. Long live Bangladesh.

Prof. Dr. Md. Golam Samdani Fakir

MESSAGE

desh on December 24-25, 2019.

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# **Green University of Bangladesh**

# **WELCOME MESSAGE**



place in permanent campus of Green University of Bangladesh at Purbachal American City, Dhaka, Bangladesh, during 24-25 December 2019, organized by the Faculty of Science and Engineering, GUB. On behalf of the organizing committee, I would like to welcome all participants, authors, academic experts, reviewers, industry professionals and keynote speakers to this wonderful event, and express my gratitude for their involvement and contributions. We received a total of 203 paper submissions, out of which 78 papers have been accepted for presentation and publication in the IEEE Digital Library, yielding an acceptance rate of 38.42%. As many of the submitted papers were good in quality another 36 were accepted for poster presentation. Every paper was gone through double-blind review process by at least three experts. The submitting authors originate from 19 countries from all parts of the globe. About 70 program committee members and 200+ reviewers from 20+ countries contributed their scholarly efforts to ensure quality. In different tracks, this conference will cover Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML), Big Data Processing, Cloud Computing, Smart Grid, Robotics, Real-Time Monitoring and Control Systems, and Computer Aided Design and Textile Due to the digitization of production, we are in the midst of a major change in the way we produce and distribute

understanding of Sustainable Technologies for Industry 4.0. The Fourth Industrial Revolution or Industry 4.0 is both an opportunity and a challenge to enhance global manufacturing output to meet the rising human needs without hurting the environment. Industrial automation, connection and aggregation of different data in corporate information systems are phenomena that need to be studied in-depth, such studies would make them contribute to the new business strategy, bringing concrete benefits. However, it is not possible to talk about innovation and industry without reference to sustainable development and sustainability. Around ten distinguished Keynote Speakers will inspire us in focus sessions, giving a glimpse of cutting edge, state of the art challenging issues. Prof Muhammad H. Rashid, from Florida Polytechnic University, USA; Prof.

Kawsar, from Bell Laboratories, USA; Prof Oksam Chae, from KyungHee University, South Korea; Prof Rahamatullah Khondoker, from Darmstadt University of Applied Sciences, Germany; Prof Atiqur R. Ahad from Osaka University, Japan, Prof Celia Shahnaz from BUET, Bangladesh, and Prof, Latifur Khan from UT Dallas, USA Finally, I would like to thank all authors, presenters, panelists, reviewers, technical and organizing committee members for their hard work, passion and commitment to shape an interesting and high-quality program. Wish you a warm welcome and an enjoyable STI 2019! Prof. Dr. Md. Abdur Razzaque

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Manufacturing Technologies which are the driving forces of fourth industrial revolution. products. The transformation is so convincing that it is called Industry 4.0 to reflect the fourth industrial revolution. Starting from mechanization by water and steam power to mass production and assembly lines, the fourth industrial revolution will take place with the adoption of miniature computing and communication devices and The STI 2019 conference aims to present theoretical and empirical studies that contribute to developing a better

Sajal K. Das, from Missouri University of Science and Technology, USA; Prof Deng Zhongmin, from Hubei Modern Textile Engineering Research Center; Prof Alamgir Hossain, from Teesside University, UK; Fahim



STI 2019 | International Conference on Sustainable Technologies for Indus



It is a great pleasure of IEEE Bangladesh Section (IEEE BDS) for being the Technical Co-sponsor of the International Conference on Sustainable Technologies for Industry 4.0 (STI) is going to be held at Green University of Bangla-

It is a great milestone that as the 2018 Chair of IEEE BDS, I led a bid submission for organizing Region 10 (R10) flagship conference in 2018, which was tremendously supported and mentored by Prof. S.A. Fattah, IEEE BDŚ Chair (2015-16) and in 2019, IEEE BDS has won the opportunity to organize TENSYMP 2020 under my leadership. IEEE BDS has received 2019 R10 Section Incentive grant of 4K USD (new initiative of R10) based on activities conducted from Nov 2018-Nov 2019 (the second highest incentive among 58 sections). In 2019, I received IEEE region 10 Humanitarian technology Activities outstanding Volunteer Award. IEEE BDS has received "2019 Outstanding Section Membership Recruitment Performance Recognition" from IEEE MGA. For the first time in Bangladesh, I led IEEE Bangladesh Section along with four IEEE Technical Society Bangladesh Chapters to organize special area focused FOUR conferences at a co-located venue during 28th Nov-1st December 2019. The conferences are: BECITHCON: IEEE International Conference on Biomedical Engineering, Computer and Information Technology for Health 2019, PEEIACON: IEEE International Conference on Power Electrical, Electronics and Industrial Applications 2019, RAAICON: IEEE International Conference on Robotics, Automation, Artificial-Intelligence & Internet-of-Things 2019, SPICSCON: IEEE International Conference on Signal Processing, Information, Communication and Systems 2019. Other co-located workshop and events took place in parallel are: SympSIST: International Symposium on Social Implications of Sustainable Technology 2019, IEEE Signal Processing Society Winter School 2019 on Multimodal Signal Processing, IEEE Bangladesh Section Industry Forum 2019, W2WEC: Women to Women Empowerment Challenge Through Humanitarian Technology , IEEE Robotics and Automation Society Hackathon 2019. During the conference 124 papers have been presented out of 203 submitted papers and 18 keynote/invited technical talks were delivered which involve contribution from 10 different countries. In total 581 authors and 121 reviewers were involved from the beginning. I have received 25th year celebration banner sent from IEEE Member and Geographic Activities (MGA) during 2018 Region 10 (R10) meeting in Malaysia. It is a great honour that IEEE BDS has received 2018 IEEE MGA Outstanding Large Section Award under my leadership and accepted the award in R10 Student/Young Professionals/Women In Engineering Congress on 31st August, 2018, Indonesia, this the highest possible recognition for a section. Prof. S.A. Fattah, IEEE BDS Chair (2015-16) has received 2018 R10 Outstanding Volunteer Award, the highest individual recognition for a professional volunteer in R10. IEEE BDS has received "2018 Outstanding Section Membership Retention Performance Recognition" in July and "2018 Outstanding Section Membership Recruitment and Retention Performance Recognition" in October from IEEE MGA. IEEE BDS has also received 2018 R10 Section Incentive grant of 3K USD (new initiative of R10) based on activities report from Jan-Nov 2018 (the second highest incentive among 58 sections). I was the founder and Technical Program Chair of IEEE WIECON-ECE 2015 in IEEE BDS, the General Chair of IEEE WIECON-ECE 2016, IEEE WIECON-ECE 2018, IEEE WIECON-ECE 2019, general Co-chair of IEEE WIECON-ECE 2017. IEEE WIECON-ECE 2019 was jointly organized by IEEE BDS and IEEE Bangalore Section, IEEE WIECON-ECE 2018 jointly organized with IEEE Thailand Section, IEEE WIECON-ECE 2017 jointly organized with IEEE Uttar Pradesh Section, and IEEE WIECON-ECE 2016 jointly organized with IEEE Pune Section. I want to mention our some other recent achievement on humanitarian technology based activity (HTA) in R10

ed the Fifth IEEE Region 10 Humanitarian Technology Conference (R10HTC) to be organized during 21-23 Dec. 2017, for the first time any R10 flagship conference held in Bangladesh Section. We got huge response (400+ papers) from around 12 countries. Many distinguished scholars supported R10-HTC 2017 by contributing papers, Page | 06

level: 2016 IEEE R10 HTA Outstanding Activities Award with citation "IEEE Bangladesh Section in recognition of

innovative humanitarian technology activities under leadership of S. A. Fattah". In 2016, IEEE BDS has been award-

## keynote/invited talks (6 fellows of IEEE and 22 invited talks), projects, and valuable reviews. Apart from the regular technical presentations we have arranged three stage project competition IHTPC 2017 supported by IEEE Humanitarian Activity Committee (HAC), where we received more than 120 projects. Thanks to IEEE R10 for helping us to

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organize ten R10 supported tracks focusing HTA during the conference to serve different group of volunteers. In 2017, Prof. S.A. Fattah has received 2017 IEEE R10 HTA Outstanding Volunteer Award in recognition of leadership and contributions to innovative Humanitarian technology of Bangladesh Section. In 2018, IEEE BDS has received a phased fund (highest in history) from IEEE Humanitarian activity Committee (HAC) to ensure clean water for IEEE BDS was established in 1993 with 56 members and its membership reached the landmark of 1000 after 21 years in 2014. During 2015-16, because of a number of quality events/activities, the membership is now more than 2,700. IEEE-BDS was awarded "Outstanding Section Membership Recruitment Performance" in 2015, 2016 and 2017 by IEEE R10. Prof. S.A. Fattah received 2016 MGA Achievement Award" For dynamic leadership in achieving

rapid transformation of the IEEE Bangladesh Section into a vibrant large section by ensuring maximum member

engagement through innovative activities." Currently BDS has 9 society chapters: communication (COMSOC), power and energy (PES), electron device/solid state circuit (EDS/SSCS), Engineering in Medicine and Biology (EMBS), Computer(CS), Signal Processing society (SPS), Robotics and Automation Society (RAS), Industrial Applications Society (IAS) and society on social implications on technology (SSIT)), two affinity groups: women in engineering (WIE) and young professional (YP), 15 WIE Student branch Affinity Groups, student chapters of different societies, such as EDS/SSCS, IAS, CS, RAS and PES, SPS, EMBS, two SIGHT groups (FLASH(IEEE BDS) and CARG(Brac University SB)), and 40 student branches in 40 universities which was 9 before 2015. In 2019, IEEE BUET Student Branch (SB) has won IEEE Darrel Chong Student Activity Award 2018 in Bronze category from IEEE MGA. Three Student Branches from Bangladesh, IEEE NSU Student Branch (SB), IEEE BUET SB and IEEE AIUB SB have received 2019 IEEE regional Exemplary Student branch Award for R10. IEEE NSU Student Branch (SB) has received 2018 IEEE regional Exemplary Student branch Award for R10, IEEE AIUB SB has received 2017 IEEE regional Exemplary Student branch Award for R10, Anindo Saha from IEEE AIUB SB became the winner of 2017 Larry K. Wilson Regional Student Activities Award for R10, M. Tanseer Ali, Counselor, IEEE

AIUB has won 2017 Outstanding Branch Counselor award from R10, all these awards are administered by MGA. A N M Nasimunnabi from IEEE UIU SB branch has received 2017 IEEE R10 SAC Student Volunteer Award and Abhijeet Biswas from IEEE BUET SB has received 2018 IEEE R10 SAC Student Volunteer Award in recognition of leadership and contributions to R10 SAC programs. I, Dr. Celia Shahnaz, founding Chair (2011-15) of WIE AG BD, have won 2013 IEEE R10 WIE professional volunteer award, 2015 IEEE WIE Inspiring Member Award from Global IEEE WIE and very prestigious 2016 IEEE MGA Leadership Award "For leadership in engineering and technology driven innovative IEEE Women in Engineering activities for enhanced membership development and engagement in Region 10 and across the globe". I was selected as 2016 IEEE R10 WIE Coordinator, for the first time BDS got a coordinator position in IEEE R10 Executive Committee. I mentored in forming 16 Student Branch WIE AGs, majority during 2015-16. Under my leadership, WIE Bangladesh Section has organized IEEE WIE international leadership Summit Bangladesh, 12-13 October, 2018 at Dhaka with a resounding success, this was the largest and the first event won from a Global MGA committee to be conducted in IEEE Bangladesh Section. WIE Affinity group (AG BDS) has won 2016 WIE AG of the year award for the activities held in 2016 from Global IEEE WIE. It has also won 2015 WIE Affinity Group of the Year Award -Honorable Mention for the activities held in 2015 from Global IEEE WIE and 2016 IEEE R10 WIE Affinity Group of the Year Award for the activities held in 2015. BUET WIE Student branch AG has won 2017 WIE student branch Affinity Group of the Year Award -Honorable Mention for the activities held in 2016 from Global IEEE WIE, 2018 IEEE R10 WIE student branch Affinity Group of the Year Award for the activities held in 2017 and 2019 WIE SB AG of the year award from global IEEE WIE for the activities held in 2019. IEEE BDS young Professionals (YP) has received 2018 IEEE R10 YP Affinity Group of the Year Award for the activities I express my sincere gratitude to all the authors, speakers, committee members, reviewers, sponsors, advisers and other members whose sincere efforts are the key factors for the success of this conference. I appreciate feedback from all the participants. I wish all the success of STI 4.0 2019.

Celia Shahnas Prof. Dr. Celia Shahnaz

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# Muhammad H. Rashid **KEYNOTE SPEAKER** IEEE Fellow

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## are many power converter circuits some of which have become standard topologies and are available as modules from the manufacturers. The demand for the development of environmentally clean, reliable and affordable energy technologies has prompted renewed interest in renewable energy systems worldwide. Many

Power Electronics Applications In Renewable Energy

**Abstract** 

renewable energy technologies today are well developed, reliable, and cost competitive with the conventional fuel generators. The renewable energy sources are generally converted to dc or ac electric voltages or currents. Many renewable energy technologies today are well developed, reliable, and cost competitive with the conventional fuel generators. The power electronics is finding increasing applications in renewable energy technologies to process efficiently and produce a flexible ac or dc output to match a variable or fixed load demand. This presentation reviews the chronological development of power electronic circuit and explains why power electronics is an integral part of energy storage and renewable energy systems for power conversion, transmission and distribution of electric power. Biography Muhammad H. Rashid is employed by the Florida Polytechnic University as a Professor of Electrical Engineering. Previously he was employed by the University of West Florida, Pensacola, Florida as a professor of electrical and computer engineering. He was also employed by the University of Florida as Professor and

Director of UF/UWF Joint Program. Rashid received B.Sc. degree in Electrical Engineering from the Bangladesh University of Engineering and Technology, and M.Sc. and Ph.D. degrees from the University of Birmingham in UK. Previously, he worked as Professor of Electrical Engineeringand the Chair of the Engineering Department at Indiana University- Purdue University at Fort Wayne. Also, he worked as Visiting Assistant Professor of Electrical Engineering at the University of Connecticut, Associate Professor of Electrical Engineering at Concordia University (Montreal, Canada), Professor of Electrical Engineering at Purdue University Calumet, and Visiting Professor of Electrical Engineering at King Fahd university of Petroleum and Minerals (Saudi Arabia), as a design and development engineer with Brush Electrical Machines Ltd. (England, UK), a Research Engineer with Lucas Group Research Centre (England, UK), a Lecturer and Head of Control Engineering Department at the Higher Institute of Electronics (in Libya & Malta). Rashid is actively involved in teaching, researching, and lecturing in electronics, power electronics, and

technical papers. He is a Fellow of the Institution of Engineering & Technology (IET, UK) and a Life Fellow of the Institute of Electrical and Electronics Engineers (IEEE, USA). He is the recipient of the 2008 IEEE Undergraduate Teaching Award with citation: For his distinguished leadership and dedication to quality undergraduate electrical engineering education, motivating students and publication of outstanding textbooks.

professional ethics. He has published 22 books listed in the US Library of Congress and more than 160

Rashid is a Distinguished Lecturer for the IEEE Education Society and a Regional Speaker (previously Distinguished Lecture) for the IEEE Industrial Applications Society. He also authored a book on "The Process of Outcome-Based Education - Implementation, Assessment and Evaluations". 2012 UiTM Press, Malaysia.

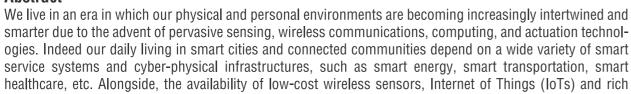
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# **KEYNOTE SPEAKER**

**Green University of Bangladesh** 



From Smart Sensing to Smart Living

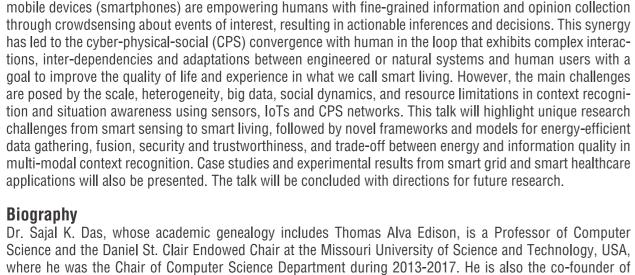


Sajal K. Das

Technology, USA

Missouri University of Science and

IEEE Fellow



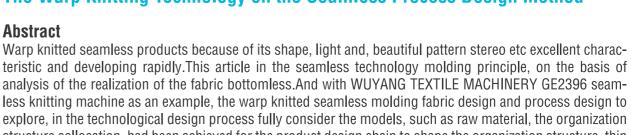
challenges from smart sensing to smart living, followed by novel frameworks and models for energy-efficient data gathering, fusion, security and trustworthiness, and trade-off between energy and information quality in multi-modal context recognition. Case studies and experimental results from smart grid and smart healthcare applications will also be presented. The talk will be concluded with directions for future research. Biography Dr. Sajal K. Das, whose academic genealogy includes Thomas Alva Edison, is a Professor of Computer Science and the Daniel St. Clair Endowed Chair at the Missouri University of Science and Technology, USA, where he was the Chair of Computer Science Department during 2013-2017. He is also the co-founder of Smart Health Beacons, LLC. Prior to 2013, he was a University Distinguished Scholar Professor of Computer Science and Engineering, and founding director of the Center for Research in Wireless Mobility and Networking (CReWMaN) at the University of Texas at Arlington. During 2008-2011. His research interests include wireless sensor networks, mobile and pervasive computing, smart environments, IoTs, crowdsensing, data analytics, cloud computing & cyber security. He has published more than 300 papers in high quality journals, over 400 conference papers, and 53 book chapters. A holder of 5 US patents, Dr. Das has coauthored four books – Smart Environments: Technology, Protocols, and Applications; Handbook on Securing Cyber-Physical Critical Infrastructure: Foundations and Challenges; Mobile Agents in Distributed Computing and Networking; and Principles of Cyber-Physical Systems: An Interdisciplinary Approach. According to DBLP, Dr. Das is one of the most prolific authors in computer science. His h-index is 84 with more than 31,500 citations

according to Google Scholar. He is the founding Editor-in-Chief of Elsevier's Pervasive and Mobile Computing journal, and serves as Associate Editor of several journals including IEEE Transactions on Mobile Computing, IEEE Transactions on Dependable and Secure Computing, and ACM Transactions on Sensor Networks.

Deng Zhongmin **KEYNOTE SPEAKER** Professor and Executive Director Hubei Modern Textile Engineering Research Center.

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structure collocation, had been achieved for the product design chain to shape the organization structure, thin fabric, the structure stability. The design method for enterprises to provide technical guidance to production. Deng Zhongmin, male, doctor, professor, Academic leader in the field of superior science and characteristics of Hubei Province, senior visiting scholar of Dicken University in Australia, and executive vice-director of Hubei Modern Textile Engineering Research Center. The research areas are textile CAD/CAM information technology and computer application in textile industry. Over the past five years, more than 30 provincial and ministerial projects have been completed, including "Digital Design and Manufacture of Textile Fabrics and Garments Complete Technology Research", "Intelligent Textile Printing System and Equipment", "Jacquard

Weaving System Technology and Equipment", and around 28 cooperative projects between enterprises. The project mainly applies computer graphics and image technology and numerical control technology to traditional textile technology, and develops a multi-category intelligent design system for knitted products in textile industry. The results are advanced in the world. It has won many awards for scientific and technological progress in Hubei Province and textile technology of Hong Kong Mulberry Foundation. It has been successfully applied in more than 100 enterprises of domestic and overseas, such as Korea, India, Turkey, Pakistan, Taiwan, Guangdong, Jiangsu, Zhejiang and other regions, which have greatly improved the efficiency of fabric design, achieved excellent social benefits.

Wearables, IoT and You - The Compelling World of Augmented Perception

Wearables and IoT are embracing AI and causing a seismic shift – in that we are observing the emergence of

remarkable sensory systems. These transformative sensory systems are capable of understanding us and the

world around us, uncovering unprecedented opportunities to help us become a better version of ourselves.

In this talk, I will explore the system and algorithmic challenges in modelling and augmenting human

behaviour in this new sensory world. I will discuss how mobile, wearable, and IoT devices together with

embedded AI can be used as a multi-sensory computational platform to learn, infer, and augment human

Dr Fahim Kawsar is the Founding Director of Pervasive Systems research at Nokia Bell Labs, Cambridge, UK

and holds a Design United Professorship at TU Delft, Netherlands. He spends most of his time at Cambridge

building sensory AI systems with novel computational forms to explain human behaviour with other people,

places, and things. Fahim is a frequent keynote speaker, (co-)authored 140+ publications, filed 30+ patents,

is an AEIC of IEEE Pervasive Computing, sits at the editorial board of ACM IMWUT, serves (or served) as a

committee member of leading mobile and ubiquitous computing conferences and had multiple million-scale

behaviour and to design ultra-personal computational experience.

**KEYNOTE SPEAKER** 

**Abstract** 

Biography

projects commissioned.

**Fahim Kawsar** 

Pervasive Systems Research Nokia Bell Labs, Cambridge, UK

Director





# Al, Big Data & Cyber Security to Empower & Enable Industry 4.0

**Abstract** Al (artificial intelligence) is one of the most important technology in the game changing world of every domain to enhance efficiency and productivity with reduced costs. In his talk, Professor Hossain will discuss how to enhance capacity through innovation and skill development to empower and enable industries/business to address the Industry 4.0 challenges. Using practical example of process industry, he will demonstrate the cyber physical systems' (CPS) challenges that can be addressed using AI (artificial intelligence) enabled

process optimisation, machine learning, big data analysis and risk analysis of deployed cyberspace.

Professor Alamgir Hossain received his PhD from the Department of Automatic Control and Systems Engineering, University of Sheffield. He is currently serving as a Professor of Artificial Intelligence and Head of Digital Research and Innovation (National Horizon Centre) at Teesside University. Prior to this he also served in the Anglia Ruskin University at Cambridge (Director of IT Research Institute), University of Northumbria at Newcastle (Head of Computational Intelligence Group), University of Bradford, University of Sheffield, Sheffield Hallam University and the University of Dhaka (Head of the Department of Computer Science and Engineering). He has extensive research experience in applied AI, decision support system, digital diagnosis, adaptive control and mobile enabled expert system. He has led many large EU & UKRI funded projects as an International Lead Investigator, worth over £16m. He organised conferences, workshops and seminars in over 15 countries. He has published over 300 research articles including 60 research articles as a co-author with the academics of 12 countries.

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**Abstract** 

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**KEYNOTE SPEAKER** 



Oksam Chae

### biomedical, security, healthcare and automobile industries. The demand of automated quantification and analysis of these large volume and still rapidly growing datasets made the image recognition technology a vital part of these developments and it is expected to play a key role in the upcoming fourth industrial revolu-

tion. To deal with the complexity and heterogeneity of image data, until now, most of the image recognition systems were developed for specific problems/applications. Thus, the developed solutions have their own standards and in many cases are not reusable. Recent developments in machine learning and deep learning approaches and popularity of open source development platforms provide some solutions to this problem by allowing novice users to reuse an existing system or to modify and adapt it to solve different problems. To generate intelligent and multi-domain applications systems, a development environment that facilitates users to create, manage and reuse user-defined algorithms efficiently is required. Over the past 30 years my research team made a significant contribution to this development and some of the methods/tools developed in my lab were made publicly available. At the same time we developed numerous new solutions in the area of image enhancement, facial image analysis and medical image processing. In this talk, I will introduce some of these developments to demonstrate how image recognition technology is applied in different fields and at the same time motivate conference attendees to be ready for the fourth industrial revolution. First, I will overview the current trend of feature representation for facial image analysis and discuss the results of our research in facial expression recognition. Second, I will introduce our work in tooth segmentation and dental image analysis. Lastly, I will review our effort to create integrated image processing software development environments and introduce the HelloVision developed by my research group to systematically generate, mange, and reuse image processing software components for both education and research. I will also discuss some research issues in those areas. Biography Oksam Chae is a Professor of computer engineering in Kyunghee University, South Korea. He developed the automatic target recognition systems for the Smart Weapons Program funded by DARPA in Texas Instrument Image Processing Lab. His research has focused on the facial analysis, medical image processing, and image processing software development environment. His research group proposed several new edge based local descriptors for facial analysis and moving object detection. He investigated the use of image processing technology for dentistry. He developed the novel way to segment individual teeth from jawbone and the image

analysis systems integrated with medical imaging systems for dental hospitals. Professor Chae has been interested in the image processing software development environment for more than 15 years. He tried to development an environment where user can easily create reusable image processing algorithm components, manage them systematically, and produce applications by simply connecting those components. As a result of his long efforts, he introduced the integrated image software development environment, called HelloVision, which was appointed (selected/commercialized?) for Excellent Korean Technology Mark. Based on his research, he founded two successful venture companies and introduced commercial software products based on image processing technology. Page | 13

**Md Atigur Rahman Ahad** 

Senior Member, IEEE

Osaka University, Japan

**Green University of Bangladesh** 

**KEYNOTE SPEAKER** 

Vision- and Sensor-based Activity & Gait Analysis **Abstract** 

Globally, research activities on healthcare, elderly support, smart homes, activity of daily living (ADL) are progressing rapidly due to the advent of IoT sensor-based systems and devices. There is a huge progress recently on vision-based activity and gait analysis – because of the availability of GPUs and the intense involvement of deep learning-based methodologies. However, the challenges are complex and diversified,

keynote speech, these scopes and challenges will be summarized and some way outs will be outlined. The talk will be based on the following works. Biography Md Atiqur Rahman Ahad, SMIEEE; Professor, University of Dhaka (DU); Specially Appointed Associate Professor, Osaka University. He did B.Sc.(Honors) & Masters (DU), Masters (University of New South Wales), PhD (Kyushu Institute of Technology), JSPS Postdoctoral Fellow and Visiting Researcher. His authored books are: "Motion History Images for Action Recognition and Understanding", in Springer; "Computer Vision and Action Recognition", in Springer; "IoT-sensor based Activity Recognition", in Springer (in

and hence, the progress in these domains are still constrained by a number of genuine challenges. In this

press). He has been authoring/editing a few more books. He published 130+ peer-reviewed papers, 60+

keynote/invited talks, 25+ Awards/Recognitions. He is Editorial Board Member of Scientific Reports, Nature;

Assoc. Editor of Frontiers in Computer Science; Editor of Int. Journal of Affective Engineering; Encyclopedia of Computer Graphics and Games, Springer: Editor-in-Chief: Int. Journal of Computer Vision & Signal Processing http://cennser.org/IJCVSP; General Chair: 9th ICIEV http://cennser.org/ICIEV; 4th IVPR http://cennser.org/IVPR; 2nd ABC https://abc-research.github.io, Guest-Editor: Pattern Recognition Letters, Elsevier; JMUI, Springer; JHE, Hindawi; IJICIC; Member: OSA, ACM, IAPR.

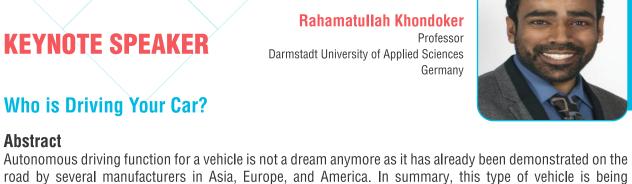
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Who is Driving Your Car? Abstract

**KEYNOTE SPEAKER** 

Darmstadt University of Applied Sciences



controlled by local computers and in some cases, remotely by humans/computers. If the autonomous driving

infrastructure is not protected properly, hackers may drive the car even though the owner might think that he has full control over the car. In this talk, I will discuss how an architecture of an autonomous driving function look like, what are the threats that exist in such an architecture, and how to tackle them. Biography Dr. Rahamatullah Khondoker is currently working as a professor at the department of computer science in Darmstadt University of Applied Sciences, Germany. He is also working as a Team and Project Leader in

Germany. Prior to that, he worked as a Researcher and Lecturer at the department of Computer Science in TU Kaiserslautern, Germany. From this university, he completed Doctor of Engineering (Dr.-Ing.) in Computer Science with the topic "Future Internet Architectures". Before that, He completed M.Sc. in Computer Science from University of Bremen, Germany. In 2015, he was nominated as a top 10 researcher by academics.de Germany. He was awarded from Ericsson, Germany in the year 2008 and from the European Future Internet Architecture (FIA) Research Roadmap Group in October 2011. He worked with the DFG project (PoSSuM), BMBF projects (G-Lab, G-Lab DEEP, FutureIN), EU projects (PROMISE, EuroNF, PRUNO), and several industry projects. Currently, he is focusing on the security and privacy of new vehicle architectures, concentrating specially on High Performance Computing Platform (HPC) located in vehicles which will be coming in the market from 2021. Previously, he worked on topics such as Future Internet Architectures, 5G, Industry 4,0, Software-Defined Networking (SDN), and Network Function Virtualization (NFV).

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# Fusion of Hand-Engineered and Deep Learning Features for Tuberculosis **Detection from Chest X-Ray Images**

**KEYNOTE SPEAKER** 

Celia Shahnaz



deep learning (DL) features gain popularity in many computer vision tasks because of their inhuman performance in comparison to the hand-engineered features. However, the extraction of high level DL features totally depends on the availability of a larger training set. Considering all these facts, we proposed a method that utilizes both the hand-engineered and deep learning-based features together for the tuberculosis detection

Tuberculosis detection from chest X-Ray images is an important and yet very dreary task to be done manually

for physicians as the number of patients is increasing day by day. In this regard, a computer-aided diagnosis

system can facilitate the process to diagnose this increasing number of patients in a shorter time. For reliable

detection of abnormality in chest XRay, different handcrafted features are used previously because of their low complexity in the extraction procedure and higher accuracy even in a small dataset. On the other hand,

Abstract

task. The major finding of this work is that a combination of these two types of features having different error profile can provide better accuracy than their performance individually. The features from both processing arms are selected based on their quality in term of standard performance measure criteria and then ensembled utilizing Random Forest classifier to classify the x-ray images. The performance of this proposed method is evaluated on the set of chest x-ray images collected by Shenzhen hospital, China. The final accuracy and area under the ROC curve (AUC) indicates that it outperforms most of the state of the art methods. Celia Shahnaz received Ph.D. degree in electrical and computer engineering from Concordia University, Montreal, QC, Canada, in 2009. Currently she is serving as a Professor in the Department of Electrical and Electronic Engineering, BUET, from where she received her B.Sc. and M.Sc. degrees in 2000 and 2002, respectively. Dr. Celia is a senior member of IEEE, a fellow of IEB and has published more than 120 international journal and conference papers. Dr. Shahnaz was a recipient of the Canadian Commonwealth Scholarship and Fellowship for pursuing Ph.D. study in Canada in 2004. She is the recipient of Bangladesh-Academy of Science gold model for her contribution in science and Engineering in Bangladesh.

RepresentativeShe is the founder and General Chair/technical Program Chair of five collocated IEEE Technical society/area specific conferences in 2019, Such as SPS, Engineering Medicine and biology (EMBS), RAS, IAS and SSIT, an initiative for the first time in IEEE Bangladesh Section.

Recently, she has been selected as the 2019 IEEE Region 10 Humanitarian Technology Activities Outstanding Volunteer Award. She has been appointed as 2017-19 IEEE PES Women in Power (WiP) Region 10 Regional

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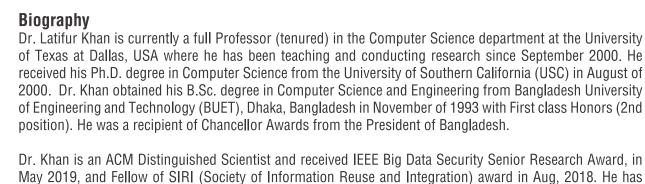
**Big Data Stream Analytics and Its Applications** Data streams are continuous flows of data. Examples of data streams include network traffic, sensor data, call center records and so on. Data streams demonstrate several unique properties that together conform to the

Informatics and IBM Faculty Award (research) 2016.

**KEYNOTE SPEAKER** 

**Green University of Bangladesh** 

characteristics of big data (i.e., volume, velocity, variety and veracity) and add challenges to data stream mining. In this talk we will present an organized picture on how to handle various data mining/machine learning techniques in data streams. In addition, we will present a number of stream classification applications such as adaptive website fingerprinting, textual stream analytics (political actor identification over textual stream), attack trace classification using good quality similarity metrics (metric learning) and domain adapta-



received prestigious awards including the IEEE Technical Achievement Award for Intelligence and Security

Dr. Latifur Khan has published over 300 papers in premier journals such as VLDB, Journal of Web Semantics, IEEE TDKE, IEEE TDSC, IEEE TSMC, and AI Research and in prestigious conferences such as AAAI, IJCAI, CIKM, ICDE, ACM GIS, IEEE ICDM, IEEE BigData, ECML/PKDD, PAKDD, ACM Multimedia, ACM WWW, ICWC, ACM SACMAT, IEEE ICSC, IEEE Cloud and INFOCOM. He has been invited to give keynotes and invited talks at a number of conferences hosted by IEEE and ACM. In addition, he has conducted tutorial sessions in prom-

Dr. Latifur Khan

Professor of Computer Science,

University of Texas at Dallas, USA

inent conferences such as SIGKDD 2017, 2016, IJCAI 2017, AAAI 2017, SDM 2017, PAKDD 2011 & 2012, DASFAA 2012, ACM WWW 2005, MIS2005, and DASFAA 2007. Currently, Dr. Khan's research area focuses on big data management and analytics, data mining and its application over cyber security, complex data management including geo-spatial data and multimedia data. His

research has been supported by grants from NSF, the Air Force Office of Scientific Research (AFOSR), DOE,

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Welcome to the Faculty of Science & Engineering, Green University of Bangladesh. It was founded in 2003

and now is comprised of three departments: Computer Science and Engineering (CSE), established in 2003;

Electrical and Electronic Engineering (EEE), established in 2003 and Textile Engineering (TEX), established in

2008. The role of deanship of this faculty is now lead by Prof. Dr. Md. Abdur Razzaque, an academic leader

**KEYNOTE SPEAKER** Head of IoT & ICT, Grameenphone Ltd Journey from IoT to 5G

STI 2019 | International Conference on Sustainable Technologies for Industry 4.0

Reduan Hasan Khan, PhD

Senior Member, IEEE



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Biography Dr. Reduan Hasan Khan, Head of ICT Business, leads Grameenphone's long-term ICT vision, and is responsible for IoT, Cloud and Enterprise Business solutions. He's also a key member of a number of projects related to B2B and IoT within Telenor Group.

mician Prof. M. Kaykobad.

cian.

of 144 credit hours.

**Chief Patron** 

**General Co-Chairs** 

**Advisory Panel** 

**TPC Co-Chairs** 

helps our students to be more competitive.

**Department of Electrical and Electronic Engineering** 

pursue their higher studies in USA, Europe, Canada, Australia and so on.

at the Technology Division of Grameenphone since 2015. He started his career as a Core Network engineer in Grameenphone in 2007. From 2011 to 2015, he worked as a Research Engineer and a Consultant at various telecommunications projects in Australia. Dr. Khan is a Senior Member of IEEE with active engagements in a number of IEEE technical communities, including Internet of Things, Cloud Computing and 5G. He has over 20 publications in various international

Prior to joining Grameenphone's Business division in 2017, Dr. Khan served as the Head of Core Operations

Dr. Khan holds a doctorate in Electrical Engineering from the University of Newcastle, Australia, where his research focused on machine-to-machine (M2M) communications over 4G networks. He received his B.Sc.

**Green University of Bangladesh Faculty of Science & Engineering** 

NSA, IBM and HPE.

Green University of Bangladesh (GUB) believes in importing quality classroom education for all students, trained and experienced faculty members are key factor in achieving this goal. Thus, GUB arranges a 4 months long "Certificate Course in Teaching and Learning (CTL)" for all newly recruited faculty members

and devoted researcher in the field of computing.

# Green University has a library with a rich collection of 17478 number of books, 30000 e-journals, and 34256 e-books. There are almost 5778 books for the students and faculty members of science and engineering majors.

**Department of Computer Science and Engineering** The degree program of Bachelor of Science in Computer Science and Engineering is accredited by Board of Accreditation for Engineering and Technology Education (BAETE) of Institution of Engineers Bangladesh (IEB). The Department of CSE has started Outcome Based Education (OBE) System since Spring 2019. The

Total number of students in both day and evening batches are 1678. Among them the day batch consists of 1087 and the evening batch consists of 591 students, respectively. There are 45 faculty members including one distinguished professor, three professors, one associate profes-

are associated with corresponding lab courses. Right now, we have six fully equipped laboratories for the students of Computer Science and Engineering such as Research Laboratory, Multimedia & Graphics Laboratory, Programming Laboratory, Networking Laboratory, Database & Warehouse Laboratory, and Hardware Laboratory.

According to the guideline of University Grants Commission (UGC) of Bangladesh & BAETE requirements, we

have reviewed and prepared our 144 credits length B.Sc. in CSE curriculum recently taking comments of both

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353 and the evening batch consists of 336 students, respectively. At present there are 18 faculty members including two professors, one associate professor, one assistant professors, and fourteen lecturers. In addition, five lecturers are now on leave to pursue their higher studies. The textile engineering department is currently lead by Prof. Dr. Nitai Chandra Sutradhar, a legendary acade-

The Bachelor of Science in Textile Engineering program is designed to give students the fundamentals of latest Textile Engineering to develop a broader view leading to a more intelligent approach to industrial and

organizational problems. In addition to theoretical lectures, this program offers extensive laboratory practice,

mician in the field of textile education in Bangladesh.

UGC. The whole degree is of 161 credit hours.

The major focus of the B.Sc. in Textile Engineering curriculum is on four major areas – Yarn Manufacturing, Fabric Manufacturing, Wet Processing and Apparel Manufacturing. Undergraduate students specialize in one of these groups without compromising fundamental knowledge in Textile. The existing syllabi of the regular four-year B.Sc. in Textile Engineering program and the B.Sc. in Textile Engi-

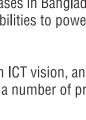
neering program for diploma holders have been reviewed and updated in 2018 based on guidelines of the

field trip, research project and an industrial internship facility in modern textile mills.

2018, an IEB evaluation team visited the department giving a positive response. The Department has academic collaboration with leading Textile Departments at home and abroad to facilitate student exchange, scholarship, joint research and credit transfer.

Library, Different laboratories, Indoor and outdoor games facilities, Playgrounds, Medical Center, Cafeteria, Gymnasium and Transport facilities for the students, etc. At present total number of students in both day and evening batches in Faculty of Science and Engineering of permanent campus is 347. Among them the Department of Computer Science & Engineering consists of 121,

This talk focus on architecture and building blocks of IoT, some emerging use-cases in Bangladesh, and how IoT has been integrated in the 5G specification with advanced features and capabilities to power the 4IR.



number of awards for his academic and professional excellence in Bangladesh and abroad, including the Australian Postgraduate Award (APA). (Hons) degree in EEE from BUET.

which is conducted by Prof. Dr. Md. Golam Samdani Fakir, honorable Vice-Chancellor of Green University of Bangladesh.

department is conducting courses, examinations, thesis/project, internship, industrial training, etc. following the guidelines of OBE system. The chairperson role of this department is recently taken over by Prof. Dr. Chowdhury Farhan Ahmed, a veteran researcher and academician in the fields of data mining and machine learning.

sor, three assistant professors, and thirty seven lecturers. In addition, nine lecturers & one assistant professor are now on leave to pursue their higher studies in USA, Europe, Canada, Australia and so on.

One of the main aspects of Computer Science and Engineering course is that almost all of the theory courses

academic and industry experts. A two-day long competitive programming event, titled "US-Bangla Airlines – Green University Inter-University Programming Contest (IUPC)", was organized by the Department of CSE in October, 2018. The key objective of the contest was to attract new talents to programming, and introduce them to programming contests. The

prize-giving ceremony was graced by Prof. Dr. M. Yusuf Ali Mollah, Member of UGC; Prof. Dr. Md. Golam

**Green University of Bangladesh** Total number of students in both day and evening batches are 689. Among them the day batch consists of

Permanent campus The permanent campus of Green University of Bangladesh is now under construction at Purbachal American City. It will be one of the largest private university campuses in Bangladesh with improved facilities for the students. The Green University Permanent Campus at Purbachal American City includes: Separate Academic Buildings for conducting classes and laboratories, Administrative Building, Hostel for local and international students, Country's one of the largest IT Center, Multipurpose Hall, Modern Conference Hall, IT-based

consists 67 students respectively. At present, there are five laboratories in permanent campus including Multimedia & Graphics Laboratory,

Department of Electrical & Electronic Engineering consists 159 and Department of Textile Engineering

Programming Laboratory, Networking Laboratory, Electrical Circuit Laboratory, Physics and Chemistry laboratory.

3. Prof. Dr. Md. Abdul Mottalib, Dean, School of Science & Engineering, ULAB The Department has eight well equipped laboratories and highly qualified and experienced faculty members having degrees from home and abroad. The Department has been offering regular B.Sc. in Textile Engineering 4. Prof. Dr. Md. Monirul Islam, Distinguished Professor, CSE, GUB courses of four year duration and B.Sc. in Textile Engineering courses for Diploma holders. **Award Committee Chair** Prof. Dr. Md. Quamrul Ahsan, Distinguished Professor, EEE, GUB Textile Engineering Department is in the process of introducing Outcome Based Education (OBE) system. In

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STI 2019 | International Conference on Sustainable Technologies for Industry 4.0

Samdani Fakir, VC of GUB; eminent scientist and writer Prof. Dr. Muhammed Zafar Iqbal and veteran acade-

In every year, CSE department organizes a gala ICT event titled "CSE Carnival". This festival includes various

2019. This department is now lead by Prof. Dr. Md. Fayzur Rahman, an experienced and devoted academi-



Total number of students in both day and evening batches are 1538. Among them the day batch consists of 538 and the evening batch consists of 1000 students, respectively. At present, there are 42 faculty members including one distinguished professor, one professor, one associate professor, four assistant professors, and thirty five lecturers. In addition, eight lecturers are now on leave to

Laboratory, Simulation Laboratory, Energy Conversion Laboratory, Telecommunication Engineering Laboratory, Microwave and Power Electronics Laboratory, Power System Projection & Switchgear Laboratory, Physics Laboratory, and Numerical Laboratory. The department is now working on Outcome Based Education (OBE) which is very important in the challeng-

cover a broad range of disciplines related to the different fields of Electrical Engineering. The whole degree is

EEE department organizes a ceremony titled "EEE Day" every year. During the EEE day program the depart-

The students are sent to visit different industries in every semester. With a view to earn industrial experience they are placed in industries for a duration of two months on a regular basis. As per requirement of OBE,

ment organizes job fair, where a number of industries participate. They collect CV's from students.

This department has already established 10 laboratories. Each and every semester, the department is upgrad-

ing and improving the laboratories by new equipment's and hence the experiments are performed properly.

Integrated Design Project has been incorporated into curriculum. **Department of Textile Engineering** The Textile Engineering Department of Green University of Bangladesh started its journey from 2008. Since its inception, the Department has been playing a dominant role in offering quality education. At present, Department of Textile Engineering of the Green University is a leading Department for Textile Engineering education in Bangladesh.

STI - 2019 **Committee** 

STI 2019 | International Conference on Sustainable Technologies for Industry

Patron Prof. Dr. Md. Golam Samdani Fakir, Vice Chancellor, Green University of Bangladesh **General Chair** 

Prof. Dr. Md. Abdur Razzaque, Pro Vice Chancellor, GUB & Dean, Faculty of Science and Engineering, GUB

Mr. Mohammed Abdullah Al-Mamun, Chairman, BoT, Green University of Bangladesh

1. Prof. Dr. Nitai Chandra Sutradhar, Distinguished Professor and Chairperson, TE, GUB

2. Prof. Dr. Md. Fayzur Rahman, Chairperson, EEE, GUB

2. Prof. Dr. Mohammad Kaykobad, Professor, CSE, BUET

**Technical Program Committee (TPC) Chairs** 

Prof. Dr. Md. Zahidul Islam, Professor, CSE, GUB

3. Prof. Dr. Chowdhury Farhan Ahmed, Chairperson, CSE, GUB

1. Prof. Dr. Md. Quamrul Ahsan, Distinguished Professor, EEE, GUB

**Award Committee Members** 1. Prof. Dr. Md. Monirul Islam, Distinguished Professor, CSE, GUB 2. Prof. Dr. Celia Shahnaz, Chair, IEEE BDS 3. Prof. Dr. S A Fattah, Appt. and Nomination Chair, IEEE BDS 4. Prof. Dr. Moshiul Hoque, Vice Chair (Technical), IEEE BDS

1. Dr. Jagannath Biswas, Associate Professor, TE, GUB 2. Dr. Md. Anwar Hossain, Associate Professor, EEE, GUB 3. Dr. Muhammad Aminur Rahaman, Assistant Professor, CSE, GUB Finance Chair

Prof. Dr. Nitai Chandra Sutradhar, Distinguished Professor and Chairperson, TE, GUB

3. Mr. Md. Ashaduzzaman, Sr. Lecturer, CSE, GUB

**Organization** Bangladesh University of Engineering and Technology Route1 Software Ltd., Canada

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Islamic University of Technology

Federation University, Australia

Islamic University, Kushtia

University of Dhaka

4. Mr. D.M. Saaduzzaman, Lecturer, EEE, GUB 5. Mr. Md. Shakhawat Hossain, PS to Pro-VC, GUB

C. Registration Kit Preparation 1. Prof. Dr. Md. Ismail Chowdhury, Professor, TEX, GUB 2. Mr. Md. Hasan Maruf, Assistant Professor, EEE, GUB 3. Ms. Sumaiya Kabir, Sr. Lecturer, CSE, GUB

**Green University of Bangladesh** 

Prof. Dr. Md. Fayzur Rahman, Chairperson, EEE, GUB

1. Dr. Md. Shariful Alam, Assistant Professor, TE, GUB

B. Venue Preparation: Opening and Closing Committee

4. Mr. Md. Shakhawat Hossain, Lecturer Lab (C), CSE, GUB

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2. Mr. Mahmudur Rahman, Deputy Registrar, GUB

3. Mr. Mohammad Asif UI Haq, Lecturer, EEE, GUB

Md. Hasan Maruf, Assistant Professor, EEE, GUB

**Event Management Chair** 

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**Event Management Co -Chair:** 

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3. Mr. Md. Monirul Islam, Lecturer, CSE, GUB

4. Mr. Md. Jahidul Islam, Lecturer, CSE, GUB

5. Mr. Dewan Saiham, Lecturer, EEE, GUB

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3. Ms. Tanjila Yeasmin Nilu, Sr. Lecturer, CSE, GUB 4. Mr. D.M. Saaduzzaman, Lecturer, EEE, GUB

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1. Mr. Shahriar Mahmud Kabir, Assistant Professor, EEE, GUB

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Dr. Md. Aktaruzzaman Dr. Md. Ashraful Alam Dr. Md. Azam Hossain Dr. Md. Kamrul Hasan Dr. Md. Saiful Azad Dr. Md. Abdullah-Al Wadud Dr. Md. Abdur Razzaque Dr. Md. Abu Layek

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Dr. Md. Mosaddek Khan

Dr. Md. Obaidur Rahman

Dr. Md. Quamrul Ahsan

Dr. Md. Robiul Hoque

Dr. Md. Zahidul Islam

Dr. Mohammad Abu Yousuf

Islamic University, Kushtia **BRAC** University Kyundong University, South Korea

East West University, Bangladesh

Green University of Bangaldesh Shahjalal University of Science and Technology Islamic University of Technology

Islamic University Green University of Bangladesh

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Bangladesh University of Business and Technology

Chittagong University of Engineering and Technology

Islamic University of Technology, Bangladesh University Malaysia Pahang, Malaysia King Saud University Green University of Bangladesh Jagannath University

American International University-Bangladesh

Bangladesh University of Engineering and Technology University of Dhaka Dhaka University of Engineering and Technology Green University of Bangladesh

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Jahangirnagar University

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Security and Privacy Competence Center, Continental, Germany. Before that, he was working as a Researcher in Fraunhofer Institute for Secure Information Technology (Fraunhofer SIT) located in Darmstadt, Germany. At that time, he was also affiliated as a Lecturer at the department of Computer Science in TU Darmstadt,

journals and conferences, including prestigious IEEE Transactions and Elsevier. He has also received a

The department has academic and industrial collaborations with reputed institutions at home and abroad. In 2018, the B.Sc. in Electrical and Electronic Engineering (EEE) degree program got the most prestigious accreditation from Board of Accreditation for Engineering and Technical Education (BAETE), Institute of Engineers Bangladesh (IEB). Department of EEE started Outcome Based Education (OBE) System since Spring

The EEE department has already established Electrical Circuit Laboratory, Analog and Digital Electronics ing world of the 21st century. Therefore, the syllabus of EEE Department has been designed so that it can

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Dr. Uzzal Kumar Acharjee

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The University of Texas at Dallas, USA

Jatiya Kabi Kazi Nazrul Islam University

Jagannath University, Bangladesh

University College Cork, Ireland

Ericsson, Sweden

STI - 2019 **Program Schedule** 

Time

DAY 1 – Tuesday, 24 December 2019 08:30 AM - 09:30 AM Registration, Breakfast & Conference Kit Collection 09:30 AM - 10:15 AM Inaugural Session 10:15 AM - 11:00 AM Keynote – 01 Tea Break 11:00 AM - 11:15 AM 11:15 AM - 11:45 AM Keynote – 02 Parallel Technical Sessions 11:45 AM - 01:00 PM 01:00 PM - 02:00 PM Prayer and Lunch Break 02:00 PM - 05:00 PM Workshop on Robotics 02:00 PM - 02:30 PM Keynote – 03 02:30 PM - 03:00 PM Keynote – 04 **IEEE BDS Activities** 03:00 PM - 04:00 PM Parallel Technical Sessions 03:00 PM - 04:15 PM 04:15 PM - 04:30 PM High Tea Break 04:20 DM - 05:00 DM

Event

04:30 PM - 05:00 PM	Keynote – 05
05:00 PM - 05:30 PM	Socialization and Advisory and Organizing Committee Meeting
DAY 2 – Wednesday, 25 December 2019	
08:30 AM - 09:00 AM	Registration, Breakfast & Conference Kit Collection
09:00 AM - 10:15 AM	Parallel Technical Sessions
10:15 AM - 10:30 AM	Tea Break
10:30 AM - 11:00 AM	Keynote-07
11:00 AM - 11:30 AM	Keynote-07
11:30 AM - 12:45 PM	Parallel Technical Sessions
12:45 PM - 02:00 PM	Interactive Poster Session
01:30 PM - 02:00 PM	Prayer & Lunch Break
02:00 PM - 02:30 PM	Keynote-08
02:30 PM - 03:00 PM	Keynote-09
03:00 PM - 03:30 PM	Keynote-10
03:30 PM - 03:45 PM	Tea Break
03:45 PM – 04:25 PM	Keynote-11 & 12
04:25 PM - 05:15 PM	Award Giving Ceremony
05:15 PM - 05:40 PM	Prayer Break and Socialization
05:40 PM - 07:30 PM	Cultural Program and Conference Dinner

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# **Green University of Bangladesh**

# STI - 2019 **Program Schedule for Keynote Sessions**

D1-K1	Keynote 01: From Smart Sensing to Smart Living
Tuesday, 24 Dec 2019	Sajal K. Das, IEEE Fellow
10:15 AM - 11:00 AM	Professor and Daniel St. Clair Endowed Chair,
Room# Seminar Hall (302)	Department of Computer Science
, ,	Missouri University of Science and Technology, USA
	Session Chair: Prof. Dr. M. Kaykobad (BUET)
D1-K2	Keynote 02: Power electronics applications in renewable energy
D I-RZ	3,
Tuesday, 24 Dec 2019	Muhammad H. Rashid
11:15 AM – 11:45 AM	Professor
Room# Seminar Hall (302)	Florida Polytechnic University, USA
	Session Chair: Prof. H. M. Jahirul Haque (ULAB)
D1-K3	Keynote 03: AI, Big Data & Cyber Security to Empower & Enable Indus
	4.0
Tuesday, 24 Dec 2019	
02:00 PM - 02:30 PM	Alamgir Hossain
Room# Seminar Hall (302)	Professor of Artificial Intelligence
	Teesside University, UK
	Session Chair: Prof. Dr. Chowdhury Mofizur Rahman (UIU)
D1-K4	Keynote 04: Transformative Computing towards a Sustainable Connec
D1-K4	World
Tuesday, 24 Dec 2019	
02:30 PM - 03:00 PM	Fahim Kawsar
Room# Seminar Hall (302)	Director, Pervasive Systems Research, Nokia Bell Labs, Cambridge, UK
	Processor of IoT, Design Engineering, TU Delft, Netherlands
	Session Chair: Prof. Dr. Md. Abdul Mottalib (ULAB)
	1
D1-K5	Keynote 05: Fusion of Hand-Engineered and Deep Learning Features 1
	Tuberculosis Detection from Chest X-Ray Images

Celia Shahnaz

Session Chair: Prof. Dr. Md. Quamrul Ahsan (GUB)

Chair, IEEE BDS Professor, BUET

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**Tuesday, 24 Dec 2019** 04:30 PM - 05:00 PM

Room# Seminar Hall (302)

STI 2019 | International Conference on Sustainable Technologies for Industry

# STI 4.0 - 2019 **Program Schedule for Keynote Sessions**

D2-K6	Keynote 06: Image Processing Software Development: Issues, Solutions
	Applications
Wednesday, 25 Dec 2019	Oleans Olean
10:30 AM - 11:00 AM Room# Seminar Hall (302)	Oksam Chae
nuulli# Scillilai Ilali (302)	Professor of Computer Vision
	Kyung Hee University, South Korea  Session Chair: Prof. Dr. Md. Haider Ali (DU)
	Session Chair. Prof. Dr. Md. Haider All (DO)
D2-K7	Keynote 07: Who is Driving Your Car?
Wednesday, 25 Dec 2019	Rahamatullah Khondoker
11:00 AM - 11:30 AM	Professor of Applied Sciences
Room# Seminar Hall (302)	Darmstadt University, Germany
	Session Chair: Prof. Dr. Hafiz Md. Hasan Babu, (NU)
D2-K8	Keynote 08: The Warp Knitting Technology on the Seamless Process Design Method
Wednesday, 25 Dec 2019	
02:00 PM - 02:30 PM	Deng Zhongmin
Room# Seminar Hall (302)	Professor and Executive Vice-Director
noonin ooniniai nan (oo2)	Hubei Modern Textile Engineering Research Center, China
	Session Chair: Prof. Dr. Nitai Chandra Sutradhar (GUB)
D2-K9	Keynote 09: Cyber Security in 4 <sup>th</sup> International Revolution
Wednesday, 25 Dec 2019	Dr. Tasmina Islam
02:30 PM - 03:00 PM	Kings College, London
Room# Seminar Hall (302)	Session Chair: Prof. Dr. Md. Zahidul Islam
D2-K10	Keynote 10: Vision- and Sensor-based Activity & Dait Analysis
DZ KIO	
Wednesday, 25 Dec 2019	M. Atiqur Rahaman Ahad
03:00 PM - 03:30 PM	SMIEEE, Osaka University, JAPAN
Room# Seminar Hall (302)	Session Chair: Prof. Dr. Md. Moshiul Haque (CUET)
D2-K11	Keynote 11: Big Data Stream Analytics and Its Applications
Wednesday, 25 Dec 2019	Latifur Khan
03:45 PM - 04:05 PM	Professor of Department of Computer Science
Room# Seminar Hall (302)	University of Texas at Dallas, USA
	Session Chair: Prof. Dr. Md. Akhtaruzzaman (IU)
D2-K12	Keynote 12: Journey from IoT to 5G
DL-KIL	, , , , , , , , , , , , , , , , , , , ,

Dr. Reduan Hasan Khan Wednesday, 25 Dec 2019 04:05 PM - 04:25 PM Head of IoT, Grameenphone Session Chair: Prof. Dr. Md. Mamun-or-Rashid (DU)

Room# Seminar Hall (302)

STI - 2019

# **Green University of Bangladesh**

# **Program Schedule for Technical Sessions**

-	4T4D4	Devellal Consign to Computer Vision Image Dynamics and Dettern
	1T1P1	Parallel Session 1: Computer Vision, Image Processing and Pattern
	, 24 Dec 2019	Recognition Session Obsides
	M – 01:00 PM	Session Chairs:
	Seminar Hall	1. Prof. Dr. Shorif Uddin (JU)
SI. No.	(302) Paper ID	2. Dr. Shahriar Sazzad (MIST)  Paper Title
	· · · · · · · · · · · · · · · · · · ·	Digit Recognition in Sign Language Based on Convolutional Neural Network and Support Vector
1.	PID-116	Machine
2.	PID-127	Plant Leaf Disease Detection using Mean Value of Pixels and Canny Edge Detector
3.	PID-150	Improvement in Hyperspectral Image Classification by Using Hybrid Subspace Detection Technique
4.	PID-160	Efficient Image Compression for Cloud System
D.	1T1P2	Parallel Session 2: Internet of Things (IoT), Cloud and Big Data Analysis
	, 24 Dec 2019	Session Chairs:
	M - 01:00 PM	1. Prof. Dr. A. B. M. Alim Al Islam (BUET)
	om# 306	2. Prof. Dr. A.K.M. Muzahidul Islam (UIU)
SI. No.	Paper ID	Paper Title
5.	PID-67	IoT Based Home Automation System with Customizable GUI and Low-Cost Embedded System
6.	PID-170	Analyzing the Quality of Water and Predicting the Suitability for Fish Farming in the Context of Bangladesh based on IoT
7.	PID-173	Precision Agriculture: Renewable Energy Based Smart Crop Field Monitoring and Managemen System Using WSN via IoT
8.	PID-178	Cloud Based Remote Healthcare Monitoring System Using IoT
D.	1T1P3	Parallel Session 3: Devices, Circuits and Systems
	, 24 Dec 2019	Session Chairs:
	M – 01:00 PM	1. Prof. Dr. Kazi Khairul Islam (Uttara Univ.)
Ro	om# 305	2. Dr. Rassel Reza Mahmud (AUST)
SI. No.	Paper ID	Paper Title
9.	PID-38	Structural and magnetic properties of zinc substituted cobalt nanoferrite sintered at various temperatures
10.	PID-111	First Principle Study of Pristine and Zn Doped B6 Nanocluster
11.	PID-162	Effect of ZnO thin films on CdTe solar cells: A Numerical Analysis
12.	PID-182	Thermal Conductivity of Silicene Naoribbon due to Ge and Sn doping
D.	1T1P4	Parallel Session 4: Photovoltaics and Renewable Energy
	, 24 Dec 2019	Session Chairs:
	M – 01:00 PM	1. Prof. Dr. Abdur Razzak (IUB)
	om# 307	2. Prof. Dr. Fakhrul Islam (IUT)
SI.	Paper ID	Paper Title
13.	PID-68	Operation Planning of Renewable Energy Based Hybrid System incorporating Waste-to-Energy
		(WtE) Technologies
14.	PID-97	(WtE) Technologies  A New Medium Voltage Modular Multilevel Inverter with Advanced Carrier-Based Pulse Width Modulation for Solar Photovoltaic Systems

Solar Based Automatic Irrigation System with GSM Module

Maximum Power Output

Performance Investigation of Different PV Array Configurations at Partial Shading Condition for

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# STI 2019 | International Conference on Sustainable Technologies for Industry 4.0 Parallel Session 5: Robotics and Real-time Control Systems



Page | 28

	, 24 Dec 2019	Jession onairs.
11:45 A	M - 01:00 PM	1. Prof. Dr. Lafifa Jamal (DU)
Ro	om# 404	2. Dr. Tushar Kanti Saha (JKKNIU)
SI.	Paper ID	Paper Title
17,	PID-87	Design of an Indicative Featured and Speed Controlled Obstacle Avoiding Robot
18.	PID-114	Optimal Worker Selection for Maximizing Quality-of-Service of Online Food Delivery System
19.	PID-143	A Smart Assistive Computer Numerical Control System for Visually Impaired People to Learn Writing
20.	PID-179	Smart Car Parking with the assistance of Line Following Robot
D. 4	<b></b>	
Doy 1	Toohnioo	I Socion 2
Day-1,	Technica	I Session 2
	<b>Technica</b> 1T2P1	Parallel Session 1: Wireless Networking and Security
D	1T2P1	
D <sup>*</sup> Tuesday		Parallel Session 1: Wireless Networking and Security
D Tuesday 03:00 P	<b>1T2P1</b> y, 24 Dec 2019	Parallel Session 1: Wireless Networking and Security Session Chairs:
D Tuesday 03:00 P	<b>1T2P1</b> y, 24 Dec 2019 M – 04:15 PM	Parallel Session 1: Wireless Networking and Security Session Chairs: 1. Prof. Dr. Md. Shariful Islam (DU)

**D1T1P5** 

D	1T2P1	Parallel Session 1: Wireless Networking and Security
Tuesday	, 24 Dec 2019	Session Chairs:
	M - 04:15 PM	1. Prof. Dr. Md. Shariful Islam (DU)
Ro	om# 306	2. Dr. Shahriar Rahman (ULAB)
SI.	Paper ID	Paper Title
21.	PID-13	Data Transmission via Wireless Channel to Store in a Remote Device Employing Error Detection and Correction Code
22.	PID-61	An Energy-Efficient Scheduling of Heterogeneous Network Cells in 5G
23.	PID-113	Prioritized IEEE 802,15.6 MAC Protocol for Wireless Body Area Network
24.	PID-188	Distributed Multi-radio Multi-channel Communication using Directional MAC for IoT-based Wireless Networks
25.	PID-190	Enhancing Quality of Service in SDN based on Multi-path Routing Optimization with DFS
D	1T2P2	Parallel Session 2: Network and Systems Optimization
	y, 24 Dec 2019	Session Chairs:
	PM – 04:15 PM	1. Prof. Md. Mijanur Rahman (JKKNIU)
	Seminar Hall	2. Prof. Dr. Shamim Al Mamun (JU)
11001111	(302)	
SI.	Paper ID	Paper Title
26.	PID-45	Design and Implementation of Industrial Utility Controller with Smart Communication by Mobile phone using GSM Technology
27.	PID-07	Characterization of Nanowire Field Effect Transistor and Comparison Based on Different Performance Criteria
28.	PID-112	Flow-based Proxy NEMO Solutions: An Analysis of the Location Update Cost
29.	PID-158	Performance Analysis for Cloud Query Encryption
30.	PID-175	An Extensive Karnaugh Mapping Tool for Boolean Expression Simplification
П	1T2P3	Parallel Session 3: Artificial Intelligence and Machine Learning
	y, 24 Dec 2019	Session Chairs:
	PM – 04:15 PM	1. Prof. Dr. Syed Akhter Hossain (Daffodil International Univ)
	oom# 307	2. Dr. Khondokar Fida Hasan (QUT, Australia)
SI.	Paper ID	Paper Title
31.	PID-93	Improved K-means Algorithm using Density Estimation
32.	PID-40	Developing the Bangladeshi National Corpus- a Balanced and Representative Bangla Corpus
33.	PID-19	A Sensor based Residential Carbon Monoxide Emission Surveillance System from Least Developed Country's Perspective
	PID-194	Rice Leaf Disease Detection Using Machine Learning Techniques

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## **Green University of Bangladesh** Parallel Session 4: Power Systems and Stability Analysis **D1T2P4**

PID-41

PID-73

	PM – 04:15 PM oom# 305	<ol> <li>Prof. Dr. Md. Omar Farrok (AUST)</li> <li>Dr. Ahmed Al Mansur (GUB)</li> </ol>
SI.	Paper ID	Paper Title
35.	PID-52	Simulation Based Comparative Stability Analysis Between Conventional and Hybrid Power System to Observe the Point of Stability
36.	PID-54	Feasibility Study on Solar Bi-facial Technology and Plant Shoot Configuration in Perspective o Bangladesh
37.	PID-55	Designing and Simulation of Power Generation Device by Employing Footbridge System
38.	PID-70	Modified Bat Algorithm with Hybridization of Gaussian Probability and Doppler Effect
39.	PID-193	Feasibility Study of IGCC Power Plant with CCP Technology In Perspective of Bangladesh
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Feasibility Study of IGCC Power Plant with CCP Technology In Perspective of Bangladesh  **I Session 3**

D2T3P1 Wednesday, 25 Dec 2019 09:00 AM – 10:15 AM Room# Seminar Hall (302)		Parallel Session 1: Artificial Intelligence and Machine Learning Session Chairs: 1. Prof. Dr. Md. Nurul Huda (UIU) 2. Prof. Dr. Md Abdul Masud (PSTU)
SI.	Paper ID	Paper Title
40.	PID-1	Extrapolation, Design and Implementation of a Bangla Web Document Amendable Text Synopsi
41.	PID-26	Convolutional Neural Network Based Skin Lesion Analysis for Classifying Melanoma
42.	PID-64	A New Benchmark on American Sign Language Recognition using Convolutional Neural Networ
43.	PID-82	Bangla word prediction and sentence completion using GRU: an extended version of RNN on n-gram language model
44.	PID-86	Automated Detection of Plant Diseases Using Image Processing and Faster R-CNN Algorithm
Wednesd 09:00 A	<b>2T3P2</b> ay, 25 Dec 2019 M – 10:15 AM	Parallel Session 2: <b>Photonics</b> , <b>Fiber Optics &amp; Optical Resonator</b> Session Chairs:  1. Prof. Dr. Md. Monjarul Alam (IU) 2. Dr. Ashraful Alam (BRAC Univ)
SI.	oom# 307 Paper ID	Paper Title
45.	PID-42	A comparative study of a PEMFC, Battery, Super-capacitor based energy source owing to hybrid vehicle
46.	PID-101	Mild-to-Moderate Vibration Sensible Cost-Effective Electricity Generating Floor Tile
47.	PID-104	Micro Wind Turbine as an Alternative Power Source in Bangladesh
48.	PID-107	Optical Properties of Plasmonic Material Based on Modified D-Shaped Photonic Crystal Fiber
49.	PID-189	Expanding the Area of Light Fidelity
Wednesd 09:00 <i>A</i>	<b>2T3P3</b> lay, 25 Dec 2019 AM – 10:15 AM com# 306	Parallel Session 3: Mobile and Internet Technologies, Smart City Applications Session Chairs:  1. Prof. Dr. Kazi Muheymin-Us-Sakib (DU) 2. Dr. Selina Sharmin (JnU)
SI.	Paper ID	Paper Title
50.	PID-99	Development of an Assistive Device for Elderly Bedbound People to Share Needs with Caregive and Controlling Home Appliances.
51.	PID-135	A UAV-Based Traffic Monitoring System for Smart Cities
52.	PID-167	LIFECRAFT: An Android Based Application System for Woman Safety
	PID-191	Android Apps Success Prediction Before Uploading on Google Play Store
53. 54.	PID-198	Minimizing Execution Cost of User Application Codes in Mobile Device Cloud

STI 2019 | International Conference on Sustainable Technologies for Industry 4.



SI.	Paper ID	Paper Title
55.	PID-27	A Simpler Design for Liquid Supply Line Leakage Monitoring
56.	PID-103	A Secure Mutual Authentication Protocol for IoT using ID verifier based on ECC
57.	PID-131	Automatic Synchronization of a Newly Installed Generator to Infinite Bus of Bangladesh Po System
58.	PID-197	Human Robot Interaction Using Sensor Based Hand Gestures for Assisting Disable People
59.	PID-200	An Enhanced Similarity Measure for Collaborative Filtering-based Recommender Systems
ay-2,	Technical	Session 4
~ <b>,</b> _,		

Parallel Session 4: Robotics, Control, & Automation

# Wednesday, 25 Dec 2019 Recognition

68.

PID-108

PID-117

**D2T3P4** 

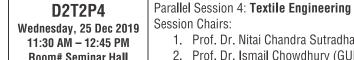
11:30	AM – 12:45 PM	Session Chairs:
R	oom# 306	1. Prof. Dr. Mohammad Abu Yousuf (JU)
		2. Prof. Dr. Md. Hasanul Kabir (IUT)
SI.	Paper ID	Paper Title
60.	PID-49	Degraded Document Enhancement through Binarization Techniques
61.	PID-95	Masked Face Recognition Using Convolutional Neural Network
62.	PID-134	Distinguish a person by Face and Iris using Fusion approach
63.	PID-148	A Proposed Method for Recognizing Complex Hand Drawn Graphs using Digital Geometric Techniques
64.	PID-164	Vehicle Number Plate Detection and Categorization Using CNNs
Г	)2T4P2	Parallel Session 2: Wireless Networking and Security
	day, 25 Dec 2019	Session Chairs:
	AM – 12:45 PM	1. Prof Dr. Md. Obaidur Rahman (DUET)
R	oom# 307	2. Dr. Md. Abu Layek (JnU)
SI.	Paper ID	Paper Title
65.	PID-59	Information Extraction from WWW using Structural Approach
66.	PID-84	An Unorthodox Way of Farming Without Intermediaries Through Blockchain
67.	PID-102	A Robust Database Watermarking using Local Differential Privacy
	1	1

D	2T4P3	Parallel Session 3: IoT, Cloud Computing and Machine Learning
Wednesd	ay, 25 Dec 2019	Session Chairs:
	M – 12:45 PM	1. Prof. Dr. Muhammad Mahbub Alam (IUT)
Ro	om# 305	2. Prof. Dr. Chowdhury Farhan Ahmed (GUB)
SI.	Paper ID	Paper Title
70.	PID-168	Execution Delay-aware Task Assignment in Mobile Edge Cloud and Internet Cloud
71.	PID-94	Forecasting Electricity Consumption using ARIMA Model
72.	PID-72	Performance Evaluation of Cloud Radio Access Network with Hybrid Supplies
73.	PID-110	A two-stage algorithm for engagement detection in online learning

Cognitive Internet of Vehicles: Motivation, Layered Architecture and Security Issues A Proposed Secure Mobile Money Transfer System for SME in Bangladesh: An Industry 4.0

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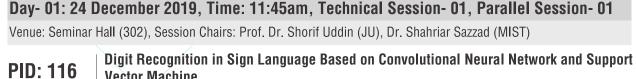


**Green University of Bangladesh** 

11:30 A	M – 12:45 PM Seminar Hall (302)	<ol> <li>Prof. Dr. Nitai Chandra Sutradhar (GUB)</li> <li>Prof. Dr. Ismail Chowdhury (GUB)</li> </ol>
SI.	Paper ID	Paper Title
74.	PID-151	Salt Free Dyeing of Cotton Fabric with Reactive Dyes by Using Cationic Fixing Agent
75.	Invited-1	An Ingenious Approach of Incorporating Sustainability Issues within Textile Engineering Curriculum of Bangladesh
76.	Invited-2	Industrial Wastewater Treatment and Solid Waste Disposal for Sustainable Textile Sector of Bangladesh

<b>D2IPS</b> Wednesday, 25 Dec 2019 12:45 PM – 02:00 PM		Interactive Poster Session Judges Panel: 1. Prof. Dr. Hafiz Md. Hasan Babu (National Univ) 2. Prof. Dr. Md. Monirul Islam (GUB) 3. Dr. Md. Anwar Hossain (GUB) 4. Dr. Jagannath Biswas (GUB)
SI.	Paper ID	Paper Title
1.	PID-10	A Smart Home Automation Panel with Earthquake Detection Capability
2.	PID-23	Smart Dual Axis Sun Tracking System For Concentrated Solar Dish Using Linear Actuator
3.	PID-30	Mobility Aware Optimal Placement of Virtual Network Functions in 5G
4.	PID-53	A Review Study on the Corrosion Inhibitor of Copper and it's alloys.
5.	PID-57	Distinguish Features of Smart Irrigation System using Solar Power
6.	PID-92	Crime Detection and Classification using Ensemble k-NN
7.	PID-199	Bangla Handwriting Recognition using Fuzzy Filter based Convolutional Neural Network
8.	PID-202	Real-Time Recognition of Bangla Vehicles Number Plate Based on Clustering and Prediction Technique
9.	PID-204	Duplicate Contents Restriction Algorithm for Copied Post on Online Social Network.
10.	PID-205	Self-acting Bus Schedule Controlling Using Fuzzy Logic
11.	PID-206	Smart Traffic Vehicle Monitoring & Authenticating System using GPS

STI 2019 | International Conference on Sustainable Technologies for Industry 4.0 **ABSTRACTS** 



Md. Shahin Alom, Md. Jahid Hasan, Md. Ferdous Wahid

**Vector Machine** 

ing shape features.

PID: 150

**Abstract** – Hearing and speech impaired individuals communicate using sign language among themselves and to the normal people. But it is challenging for non-sign language speaker to understand

the sign language. Thus, sign language speaker or signer often finds difficulties in expressing their feelings. Hence, in this paper we have presented a method by combining convolutional neural network (CNN) and support vector machine (SVM) to recognize digits in sign language. We have employed the proposed model with two renewable Sign Language dataset namely MU\_HandImages\_ASL and standard databases-SLD in order to measure efficacy of the model. The proposed model achieved average test accuracy 98.20% on ASL data and 98.30% on SLD data that indicates the model is very dependable and convincing to aid to communicate between signers and non-signers.

Plant Leaf Disease Detection using Mean Value of Pixels and Canny Edge Detector PID: 127 S.M. Taohidul Islam, Md. Abdul Masud, Md. Arif Ur Rahaman, Md. Mehedi Hasan Rabbi

**Abstract** – Now a day's image processing is used to solve different types of problems. One of the problems is plant disease detection. However, image processing is considered as difficult and challenging task to apply. The first challenging task is different feature extraction. This paper presents two novel approaches to extract different types of features like color, shape, and texture from plant leaves to detect different types of diseases. To extract the color feature, the mean value of the pixels of the diseased area is calculated. To perform this operation, masking is applied on RGB images to mask the green pixels by black pixels and then the mean value of three base color band namely red, green and blue are calculated separately. We used the Canny edge detector to present edges which mainly contains texture and shape information of an image. Then inter-edge distances are calculated in the unit of pixels. These edge distances are calculated from row and column separately of an image and obtained two arrays. Histogram analysis is applied to these two arrays for calculating frequency and found another two array which contains the frequency of distances. After that, normalization is

done to obtain texture features, and the ratio of elements of the two frequency arrays is calculated for obtain-

Improvement in Hyperspectral Image Classification by Using Hybrid Subspace Detection

Arifa Islam Champa, Md. Fazle Rabbi, Nayan Banik **Abstract** – Hyperspectral imaging has been an important fieldfor researchers having numerous applications in many sectors. But this has been extensively used in ground cover classification. Due to the high dimensionality of hyperspectral imaging, ithas become a daunting task for researchers and a possible solution to this is feature reduction. In this paper, we proposea hybrid technique for feature reduction by combining featureextraction and feature selection. After extracting the featuresin first technique, feature selection is applied. Here PrincipalComponent Analysis (PCA), a well-known feature extractiontechnique has been used and normalized Mutual Information(nMI) has been chosen for selecting features. Finally classificationis done using Kernel Support Vector Machine (KSVM). Thisproposed algorithm (PCA-nMI) offers 97.2662% classficationaccuracy for AVIRIS dataset and 99.2074% classfication accuracyfor HYDICE dataset.

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Page | 34

**PID:** 67

Precision Agriculture: Renewable Energy Based Smart Crop Field Monitoring and

Abstract - Although economy of the 21st century is exceedingly reliable on industrialization, agricul-

ture works as an unavoidable driving force for economic growth of the country like Bangladesh

where advancement of wireless technologies, computational techniques and system engineering have

rendered new opportunities to promote our existing agricultural system. This paper work depicts

the design and implementation of a solar energy based precision agriculture (PA) with wireless sensory network (WSN) via Internet of Things (IoT) architecture to meet the demand of finding highly efficient methods for smart agricultural monitoring and management system. Our proposed system will

provide valuable data about salt water intrusion, soil moisture, water level, humidity, temperature as

well as the general condition of the crop field to the farmers in a user friendly, easily accessible manner with real time data communication via IoT. We can monitor the crop field conditions by using smartphone

and will be able to take the necessary steps remotely on the basis of present conditions. We have

utilized our proposed system and collected experimental data from south-western and south-eastern

**Abstract** – Now-a-days new technology in various areas is used to improve the quality of human life. People

are mov-ing toward the IoT based systems for living their life morecomfortable. The main goal of this paper

is to implement acloud based remote health-care monitoring system using IoT. The proposed architecture

collects the patient's health relateddata using sensor nodes and transmits it to the cloud. In thecloud, the data

will be further processed and analyzed. Thedata can be viewed remotely at any time anywhere by a smartde-

vice. Besides, concerned authorities will be notified for anyabnormal data. The system is finally implemented

Day- 01: 24 December 2019, Time: 11:45am, Technical Session- 01, Parallel Session- 03

Structural and magnetic properties of zinc substituted cobalt nanoferrite sintered at

Venue: Room-305, Session Chairs: Prof. Dr. Kazi Khairul Islam (Uttara Univ.), Dr. Rassel Reza Mahmud (AUST)

S. Nasrin, M. Moazzam Hossen, F.-U.-Z. Chowdhury, S. Manjura Hoque

**Abstract** –  $Co_1 - Zn_1 F_{ab}O_4$  (x=0.2, 0.4, 0.6 and 0.8) were prepared using typical wet chemical co-precipitation technique. The ferrite specimen have been sintered at 700°C and 900°C for three h in air. X-ray diffrac-

tion (XRD) diffractogram and M\ssbauer spectroscopy technique were employed to describe the nanoferrites. The spinel cubical structure was established from XRD studies. Employing vibrating sample

magnetometer (VSM), saturation magnetization, remanent magnetization, etc. have been determined.

The value of coercivity confirmed that all the samples were soft ferrites. Increasing zinc content, the

value of saturation magnetization consequently decreasing. Ferromagnetic to superparamagnetic transition

has been seen by M\ssbauer spectroscopy. Furthermore, with the addition of zinc, the ions at the tetrahedral

site shifted to the octahedral site which has been proved by the subsistence of a central doublet and

two magnetically split sextets. Complex permeability has been determined employing an impedance

analyzer. The real and imaginary part of initial permeability along with loss tangent was calculated within

the frequency range 1kH, to 120 MHs. It shows constant value at the high-frequency range that is identical

properties for the ferrite samples to apply the materials for storage device applications.

Cloud Based Remote Healthcare Monitoring System Using IoT

Habiba Binte Aziz, Selina Sharmin, Tanvir Ahammad

using IoTdevices which are provided us health related data efficiently.

various temperatures

Management System Using WSN via IoT Mohammad Samunul Islam, Golap Kanti Dey

**PID: 173** 

part of Bangladesh.

**PID**: 178

PID: 38

### **Efficient Image Compression for Cloud System** PID: 160 Farhan Israk Yen, Md. Mahfuzur Rahman

Abstract - There has been an increasing demand to store a large quantity of images generated in social media, eHealth, and other popular domains. Due to the rapid uses of digital images, an efficient and fast compression technique is needed for any cloud based industrial applications. This paper introduces and describes an idea of compressing images using Hadoop to reduce the storage requirement of data (with images). The proposed strategy can provide storage efficiency and provides an easier methodology to reconstruct the image in future when needed.

Day- 01: 24 December 2019, Time: 11:45am, Technical Session- 01, Parallel Session- 02 Venue: Room-306, Session Chairs: Prof. Dr. A. B. M. Alim Al Islam (BUET), Prof. Dr. A.K.M. Muzahidul Islam (UIU)

IoT Based Home Automation System with Customizable GUI and Low Cost Embedded System

Md. Emdadul Hague, Md. Rajibul Islam, Md. Tarigulhasan Fazle Rabbi, Jahir Ibna Rafig

Abstract - This paper presents a customizable GUI and aninexpensive embedded system with internet connectivity formonitoring and controlling several devices and home appli-ances remotely, using android-based smart phone application or computer-based application. The system consists of a customiz-able GUI that facilitates the users' demand; micro-controllerhelps convey the user input to the system; wireless connection to the devices under the system. This study explains the overall design of a low cost Home Automation System (HAS) withwireless (WiFi) system (Internet). This HAS is designed to assistand provide support in order to fulfill the needs of children, elderly people and common disabled individuals in their home. In addition, the smart home concept based on IoT improves the standard of living at home. The main control system implements aclient server relationship to provide remote access from smartphone through wireless Internet technology. The switches of theelectrical appliances are synchronized with the entire controlsystems in a way that every user interface displays the real timestatus of the existing switches. Using EEPROM, the last statusis preserved and in case of power cut, the system will retain thelast-known reading when it recovers from a sudden calamity. Thenovelty of the system is it gives permission to multiple users at the same time to access the system and change their priority. This system is designed with customizable GUI, inexpensive embeddedsystem, and it is easy to install, control and monitor with an arrayof electronic devices widely used in everyday home chores. Analyzing the Quality of Water and Predicting the Suitability for Fish Farming in the

PID: 170 Context of Bangladesh based on IoT Marzia Ahmed, Md. Obaidur Rahaman, Mostafijur Rahman, Mohammod Abul Kashem Abstract - Nearly 5.3% of the national income of Bangladesh comes from fish. Fishes are the significant natural essentials that help to grow national income, nutrition, reduce the unemployment

problem of a country and also earn foreign currency. Furthermore, it's a great source of low cost, high protein and other health beneficiary nutrients comparative to red meat. Nonetheless, to fulfill the expected demand for fish, the existing system and conventional fish farming has been failed to raise the amount of fish needed for the growing population. This paper analyzed the water quality parameters standards for the suitability of fish farming and the causes of fish diseases affected by the parameters through collected ponds data from the different areas of Bangladesh. Several machine learning algorithms have been compared for accuracy for the significance water level and error rate. Logistic regression has been fitted better to train and test part. The prediction has been done to find out whether the new pond's water quality is suitable for fish farming with respect to the value of quality parameters. An empirical IoT based system design has been given to comparing the prediction in the future. Moreover, this research also analyzed the feasible environment parameter and standards for fish growth, the reason, and risk for fish death as well as the growth rate of

fish by monitoring the quality parameters of water for fish. Page | 35

**Green University of Bangladesh** First Principle Study of Pristine and Zn Doped B6 Nanocluster **PID: 111** Maliha Nishat, Md. Rakib Hossain, Most. Farzana Israt, Md. Kamal Hossain, Farid Ahmed,

Md. Abul Hossain, Tahmina Ferdous Abstract – 2D nanomaterial becomes one of the most dynamic areas of nanomaterial researches due to their encouraging application and the discovery of Borophene opens up a vast field of research interest. Recently metal boride clusters are highly investigated because of their impressive properties and inspired by this, we

have theoretically investigated the geometry, stability, electronic and optical properties of the Zn doped B6

nanoclusters with the density functional theory (DFT) calculations. The adsorption phenomena of Zn on B6 nanoclusters is explored with the analysis of Mulliken charge transfer, adsorption energy and thermodynamic parameters. Based on our results of adsorption energies and change of enthalpy ( $\Delta H$ ), it is inferred that physisorption occurs for doping Zn atom in B6 structure. Electronic properties are investigated by dipole moment, global indices and HOMO-LUMO energy gap (Eg) analysis. For pristine B6 the value of HOMO-LUMO gap is 0.792ev whereas for ZnB6 and Zn2B6 it is 2.198ev and 0.086ev respectively. It indicates the value of Eg decreases drastically after doping Zn atom bi-pyramidally in B6 which is also pictured by density of state (DOS) spectra. Furthermore, the DOS graphs refer to orbital hybridization for these structures. UV-Vis spectra refer eminent blue shift for the doped clusters and circular dichroism (CD) spectra indicate that B6 cluster turns into optically active material for doping Zn atom. Effect of ZnO thin films on CdTe solar cells: A Numerical Analysis PID: 162 K. A. A. Mamun, Abdullah Al Mamun Momen, Sonkor Kanti Nath, I. Meah, M. M. Rahman **Abstract** – CdTe solar cell is found favourable material for solar cell due to its ideal energy band gap, absorption coefficient, and higher efficiency. The efficiency and performance of CdTe solar cell can be further improved by adding ZnO as front contact. Zinc oxide has both semiconducting and piezoelectric properties,

structures among all materials due to its structures and properties. In this paper, ZnO thin film has been analysed using the one-dimensional simulator AMPS-1D (Analysis of Microelectronic and Photonic Structures) to determine it's maximum efficiency. Different parameter of ZnO (100nm) thin film is simulated such that sun intensity, temperature, thickness, relative permittivity, mobility and effective density of state. The maximum efficiency of ZnO thin film is found 22.836%. The study highlights the changing of different parameter of ZnO thin film and improves its efficiency. Thermal Conductivity of Silicene nanoribbon due to Ge and Sn doping PID: 182 Md. Abir Hassan, Proshanta Kumer Das Abstract - Recently the two dimensional honeycomb structure of silicon namely silicene has captured a deep interest of theresearchers fot its excellent electronic and inadequate thermaltransportation properties. The lower value of thermal conduc-tivity of silicene has made it a suitable material in case ofthermoelectric applications. To enhance the thermoelectric figure of merit, the effect of chemical doping

which makes it an optimum choice front contact for any solar cell. ZnO is one of the best options for nano-

on silicene nanoribbonalong zigzag direction has been investigated in this study. Twodifferent atoms-Ge and Sn from the same group of siliconhave been added as impurity atoms with various doping

orien-tations. Our experimental data have revealed strong dependencyof thermal conductivity on both doping amount and dopingpatterns. The thermal conductivity of 0.89% Ge doped zigzagsilicene nanoribbon has been found to be around 7.32 W/mKwhereas due to higher atomic mass of tin atom compared togermanium the value of the same parameter has been found tobe around 6.2 W/mK for same doping concentration at roomtemperature. Also among different doping patterns, edge dopinghas shown lowest value of thermal conductivity for all dopingconcentrations due to elevated phonon scattering rate at the edgesof the ribbon. Further investigation have revealed the strongwidth dependence of the doped nanoribbon structure that shows an increasing trend with ribbon width for any type of dopantatom. All these results suggest that zigzag silicene nanoribbondoped with both germanium and tin atoms have comparativelylow thermal conductivity than the pristine structure and can bea potential thermoelectric material of the next generation. Page | 37

**PID: 73** 

Day- 01: 24 December 2019, Time: 11:45am, Technical Session- 01, Parallel Session- 04 Venue: Room-307, Session Chairs: Prof. Dr. Abdur Razzak (IUB), Prof. Dr. Fakhrul Islam (IUT)

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Operation Planning of Renewable Energy Based Hybrid System Incorporating PID: 68 Waste-to-Energy (WtE) Technologies Md. Rashidul Islam, Jobair Al Rafi, Md Sajjad Hossain Abstract – The Selection of Renewable energy to produce electricity is increasing rapidly in Bangladesh because of its optimistic environmental impact and independent foundation of Energy. Besides this, the

generation of electricity in our country is still incapable to meet its demand. Therefore, this paper presents an operation planning of RE-based Hybrid Energy system including Photovoltaic, wind turbine, and Waste-to-Energy (WtE) technologies to Chittagong, Bangladesh. The primary goal of this research is to show the potential of WtE technologies including PV, and Wind which optimized according

definitely help to achieve the goals of sustainable technologies.

Width Modulation for Solar Photovoltaic Systems

**PID: 97** 

PID: 41

PID: 143

**PID: 13** 

PID: 190

Ahsan Habib

to their total installation capacity and carbon credit cost. The outcome of this study has been carried out to

show the supply of electricity to specific residential load and the target to reduce the cost of energy consid-

ering environmental impact. Solar and wind potentials have been estimated from NASA surface meteo-

rology. HOMER Energy is used for optimization and cost analysis for the hybrid system. After all, Produc-

ing Electricity from the trashes with Renewable Energies and make the wastes as a source of energy will

A New Medium Voltage Modular Multilevel Inverter with Advanced Carrier-Based Pulse

Md. Tarigul Islam, Md. Rabiul Islam, Md. Shizer Rahman, Md. Fayzur Rahman, Md. Ashib Rahman Abstract – For medium and high-power applications, reduced switch multilevel inverters (MLI) have drawn considerable attention from the industry and the academia alike due to their diverse benefits like the requirement of a smaller number of voltage sources and switching devices, and better control functionalities compared to the traditional MLI topologies. In this paper, a new symmetric MLI is proposed for the grid integrated photovoltaic (PV) power generation system. An extensive comparison demonstrates that the number of the switching devices with the proposed topology is less in comparison to that of the existing MLI topologies, which is the main objective of this paper. The proposed topology is simulated in MATLAB/Simulink to carry out the necessary analysis and comparisons to the existing ones in terms of the number of switching devices and power diodes, cost, weight, and the percentage of total harmonic distortion. Simulation results demonstrate that the proposed topology uses only 67% switching devices and 40% power diodes than other MLI topologies to generate 15 level output voltage with low total harmonic distortion than existing topologies. Due to the reduced switching devices and power diodes count, the proposed topology offers less switching loss as well as increased efficiency with the reduced overall system cost. The proposed MLI topology has a great potential for the industry applications and the realization of a sustainable solar PV system.

farming system, using technical advancement to meet the peak demand for food, and improving farming methods are the key objectives. ATmega 2560 microcontroller, Sensors, GSM module, LCD, and Solenoid valve has been used as a prime component. Temperature, humidity, and water level corresponding to a particular field has

Abstract - In this investigation, the traditional irrigation system of Bangladesh has been modernized using

recent technology for the betterment of rural farmers, and its impact upon agricultural development has been

discussed. More precisely, user-friendly watering in the field, along with reducing labor cost, standardization of

Md. Munirul Islam Tusher, Md. Zahirul Haque, Mohammad Jalal Uddin, Arif Mainuddin,

Solar Based Automatic Irrigation System with GSM Module

Mohammad Ehsanul Hogue, Md. Mohin Uddin Talukder

been measured. That information has been sent to its user through a short message service. Finally, the pump has been controlled based on the water requirement. As a result, a certain amount of water and electricity can be saved, which has been calculated. Manual and automatic operation mode also substantiated. Page | 38

**Abstract** – Partial shading causes multiple peak points in power-voltage (P-V) curves of photovoltaic (PV) arrays, and that results in mismatch power loss (MML). In vast PV arrays, output power decreases significantly with increasing the shading size. The shading effects can be minimized by changing the array. This

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**Condition for Maximum Power Output** Ahmed Al Mansur, Md. Ruhul Amin

paper investigates the performances of different PV array configurations to obtain maximum output power for six different sizes of shading patterns. The experimental investigation is carried out using a 4×6 PV array with series-parallel (SP), total-cross-tied (TCT), ladder-diagram (LD), honey-comb (HC) and bridge-linked (BL) configurations. The results show that TCT configuration gives higher output power than other configurations.

Performance Investigation of Different PV Array Configurations at Partial Shading

A comparative analysis is performed among the five configurations under different shading conditions for MML reduction and improvement of the percentage of recoverable energy (%RE). The TCT configuration yields a maximum %RE of 30.48% for a 4×6 PV array. Day- 01: 24 December 2019, Time: 11.45am, Technical Session- 01, Parallel Session- 05 Venue: Room-404, Session Chairs: Prof. Dr. Lafifa Jamal (DU), Dr. Tushar Kanti Saha (JKKNIU) Design of an Indicative Featured and Speed Controlled Obstacle Avoiding Robot **PID: 87** Erteza Tawsif Efaz, Abdullah Al Mamun, Khan Salman, Fahmid Kabir, Sved Nazmus Sakib. Irfan Khan Abstract – The paper represents the design of an Obstacle Avoiding Robot with the capability of detect-

a robotic unit based on Arduino UNO and Adafruit Motor Shield where the code is written in Arduino IDE Software. Obstacle avoidance is one of the considerable key factors for developing mobile robots. The implementation of the Ultrasonic Distance Sensor placed on the Micro-Servo Motor yielded more precision for detecting the surrounding objects. This designed robot is different than other available robots

ing objects in its course and navigating around those objects by making a proper decision. It demonstrates

because of the integration of a Magnetic Buzzer and a CC RGB Diffused LED by which it has achieved the

ability to indicate object detecting procedure and control the speed of DC Gear Motors in 4 types of

circumstances. As an autonomous robot, the potentiality to maneuver through unknown conditions with-

out creating any impact was executed. Furthermore, this designed technology can be deployed for military operations and humanitarian assistance by improving the capacity of object detection in diverse environments. Optimal Worker Selection for Maximizing Quality-of-Service of Online Food Delivery PID: 114 Farhana Huq, Nahar Sultana, Sujan Sarkar, Md. Abdur Razzaque, Mosaddek Hossain Kamal **Abstract** – The selection of workers for carrying out tasks in mobile crowdsourcing systems that maximizes Quality of Service (QoS) is a challenging problem due to their diverse task completion properties and profit demands. The existing works in the literature are limited either by merely considering the minimization of task completion time only or exploitation of colocated locations of the worker and task. In this paper, we have developed an optimization framework to make a trade-off in between the profit of workers and task comple-

tion time. The proposed framework considers locations related to task's service point, task's delivery point and current location of the worker. The results of performance studies depict that the proposed system offers

competitive task delivery time as well as workers' profit.

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correction code. The transmission end of the system collects data from various sensors and then transmit

them employing linear block code. The receiving unit receives the code word transmitted by transmitter

circuit, check error, correct the error bits if any error occurs and finally decode data. The data is then stored

in an SD card for further analysis. The system is tested for collecting data from a sensor array consisting of

Md. Shahin Alom Shuvo, Azad Rahaman Munna, Tamal Adhikary, Md. Abdur Razzaque

**Green University of Bangladesh** 

part.

PID: 188

cases, they are pretty much high in price as well. Most importantly, it becomes difficult for the visually impaired people to communicate through papers in the absence of this highly priced system. For day to day activities blind people often rely on pen and paper to relay short messages using words

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A Smart Assistive Computer Numerical Control System for Visually Impaired People to

which they have learnt by sensing hand movement of others while writing. However this process

takes a long time and also requires someone's assistance in the learning process. This makes it very difficult for less privileged people who do not get the adequate support or assistance to learn writing using pen and paper. This barrier can be erased through an automated assistive Device. The device is a microcontroller based Computer Numerical Control system with dc motors and linear slide potentiometers. The system also has a 3D printed keypad for input and a headphone, and vibration motor to provide feedback. The feedback system makes it easier to operate the device and enables one individual

to learn the patterns of different kinds of shapes of alphabets or geometrical figures without any

human intervention. Industry 4.0 factories have provided machines which involves wireless connec-

tors or sensors that is linked to a computer or microprocessor that can monitor the whole production line and determine the result on its own. Our proposed model is a microcontroller based device that

Sayantan Roy Arko, Arka Ghosh, Abrar Bin Shahid, Sara Tasnim, Jia Uddin Abstract – It is well known that Braille Systems are used for assisting visually impaired person to read and

write. But most of braille systems are not that effective without human interference and in some

can generate different kinds of patterns and shapes on its own which is the actual essence of Industry 4.0. Therefore, this assistive device will help visually impaired people in a great extent by teaching them the patterns and shapes of different alphabets. Smart Car Parking with the assistance of Line Following Robot PID: 179 Meherin Hossain Nushra, Quazi Ashikur Rahman, S.M.Faiaz Mursalin, Nashita Binte Asad Abstract - This paper proposes a smart indoor car parking system that can be time and cost effective at the same time. The term "assistance" stands to signify that the parking will be conducted by line following robots carrying the car from the entrance of the parking area. In this paper we have discussed a real-life implementation of a conventional line following robot, using it for the indoor car parking system enhancement through some additional features; other than only following a line. Our proposed system will have its implementation cost really low due to the ease of availability of the required technology. The technologies available in the market at present in order to help with indoor car parking; mostly require some extra structural designs which can only be installed during the construction of new buildings. However, existing traditional parking systems are huge in numbers and cannot be reconstructed in a convenient manner to match those systems; even sometimes the renovation is impossible in some cases. Therefore, our newly featured line following robot can be a proposed solution to those existing problems in the available indoor car parking systems giving an efficient alternative for the users.

Mohammad Abdur Razak **Abstract** – Data collection from wireless sensor array or sensor network is essential for diverse applications

Day- 01: 24 December 2019, Time: 03.00pm, Technical Session- 02, Parallel Session- 01

Data Transmission via Wireless Channel to Store in a Remote Device Employing Error

Mohammed Abdul Kader, Mohammad Mamun Uddin, Md. Arifur Rahaman, Naeemul Islam,

Venue: Room-306, Session Chairs: Prof Dr. Md. Shariful Islam (DU), Dr. Shahriar Rahman (ULAB)

**Detection and Correction Code** 

such as weather monitoring, agriculture data monitoring etc. During wireless data communication, the communication channel may be subjected to channel noise and thus introduce transmission error which occurs receiving of misinformation about the situation. The main objective of this research is to develop a wireless data acquisition system which can collect data from wireless sensor array employing error detection and Page | 40

STI 2019 | International Conference on Sustainable Technologies for Industry 4.0

Abstract - Remarkable growth of network traffic has beennoticed recently due to the use of online

applications and cloud services. Thus, multiple routing problems need to solvewithout increasing latency to optimize the traffic. Based on theresponses from industry, Software Defined Networking (SD-

N)has been developed to meet this challenge. SDN allows theprogrammable features of network

and responds dynamically. In this paper, multipath routing problem in SDN is addressed and resolved under OpenFlow protocol where Ryu controllersare used to implement SDN using the Mininet WiFi

three sensors. The result shows that the system is capable of detecting and correcting an error to ensure error-free communication through a noisy channel. An Energy-Efficient Scheduling of Heterogeneous Network Cells in 5G PID: 61

kept active always. Existing energy-saving approaches offerlimited improvement due to considering mere historical data-driven two states system model. In this paper, we assume fourstates for network cells and design an optimal scheduling of smallcells to satisfy user's QoS using minimum number of activated small cells in a network. It optimally schedules a small cell inone of the four states at a given time. Our analysis depictsthat proposed system offers significant performance improvement compared to the state-of-the-art work.

Abstract - In fifth-generation (5G) wireless communication sys-tem, small cell networks (SCNs) are the key

technology to providehigh Quality of Service (QoS) to the mobile users. However, meeting exponentially

increasing data rate of the users demandsdeploying large number of SCNs which is energy-hungry if they are

Prioritized IEEE 802.15.6 MAC Protocol for Wireless Body Area Network **PID: 113** Nahar Sultana, Farhana Hug, Md. Abdur Razzague, Md. Mustafizur Rahman Abstract - Collecting data from heterogeneous on body and implanted sensor devices of Wireless Body Area Network (WBAN) is a challenging problem due to interference and strict delay deadlines of application data. While prioritized data collection is addressed in the literature for inter-WBANs, however how to prioritize medium accesses from different intra-WBAN sensor devices is yet to be explored. In this work, we develop collaborative medium access mechanisms (CMAC) for critical and noncritical data traffic co-located with relevant data. We develop new super frame structures for accommodating different data types and schedule their transmissions based on their priorities. The result of performance analysis depicts that the proposed MAC mechanism offers significantly reduced data delivery delay for the critical traffic compare to its counter-

Distributed Multi-radio Multi-channel Communication using Directional MAC for

Abstract - In the era of fourth industrial revolution (i.e., industry 4.0), IoT based smart networking uses sustainable technologies for smart cities and smart home. To contribute in such industrial development, in this paper, a Distributed multiradio multi-channel directional (DM2D)-MAC protocol is introduced for IoT-based wireless networks. Directional transmission is responsible for higher antenna gain, reduced interference and spatial reuse with higher data rates. However, such protocol experiences directional hidden

Arpita Howlader, Kazi Monir Ahmed, Md. Obaidur Rahman

**IoT-based Wireless Networks** 

and multi-channels). As of now, lots of techniques such as synchronization, busy-tone, cooperation among nodes have been used to address those mentioned issues by using a separate data-channel as Common Control Channel (CCC). As a result, due to bottleneck in CCC overall throughput drastically falls. However, we have designed DM2D-MAC protocol as an asynchronous directional dual antenna protocol to overcome the low-throughput complications utilizing the guard-bands as common channels. Therefore, it intercepts the channels of the licensed spectrum as well. With the help of guard-bands and perfect negotiation among the nodes proposed protocol shows a fair raise in overall network throughput and fairness among the use of channels. Page | 41

Flow-based Proxy NEMO Solutions: An Analysis of the Location Update Cost

assessing the location update cost in PNEMO environment so as to give knowledge in the detail of the high-

Shayla Islam, Aisha Hassan Abdalla Hashim, Mohammad Kamrul Hasan, Abdur Razzague,

terminal problem, deafness and head-of-line blocking problem irrespective of number of channels (i.e., single

PID: 112

emulator. Besides, in addition to a graphical user interface, a module hasbeen developed using python programming along with OpenFlowbased Ryu controller. In the simulation results, depth first search(DFS) algorithm outperforms over breadth first search (BFS) interms of round trip time (RTT), delay and throughput. Hence, this article enhanced the quality of service (QoS) in SDN.

Enhancing Quality of Service in SDN based on Multi-path Routing Optimization with DFS

Md. Sajid Hossen, Md. Habibur Rahman, Md. Al - Mustanjid, Md. Arif Shakil Nobin, Md.

Day- 01: 24 December 2019, Time: 03.00pm, Technical Session- 02, Parallel Session- 02 Venue: Seminar Hall (302), Session Chairs: Prof. Md. Mijanur Rahman (JKKNIU), Prof. Dr. Shamim Al Mamun (JU) Design and Implementation of Industrial Utility Controller with Smart Communication by PID: 45 Mobile phone using GSM Technology Abu Ridwan Pavel, Dr. Nur Muhammad, Md. Nasir Uddin, AFM Kaiser **Abstract** – This project has been designed to provide monitoring and alarming system in some fixed place during a failure in machine operation with resetting system through GSM controller and to reduce the stress to control a lot of industrial heavy electrical appliance located in a clogged place. A DC power supply unit, Liquid crystal display, Bluetooth controller, GSM controller and Arduino UNO along with relay module and

Some Indicator lamp with Alarming has been used to implement this project. The efficiency of the project has

been calculated about 96.87%. We used the GSM controller to get notification or status of the utility and to

control the utility at any instant of time to increase productivity. The proposed Monitoring and controlling

system is more advantageous than the traditional manual control panel used in our country, which will reduce

the operator cost and time to operate a lot of machine at a time from quite a distance away. Characterization of Nanowire Field Effect Transistor and Comparison Based on Different **PID: 07 Performance Criteria** Sabrina Hassan Moon, Naima Nasrin Nisha, Jibesh Kanti Saha

**Abstract** – This work presents a characteristic study of Cylindrical Surrounding Gate Nanowire Field Effect

Transistor for two different channel material (Si, GaAs). The device simulation has been carried out both in

Semi-classical regime using the Drift-Diffusion method and quantum regime using the Self-Consistent

Non-Equilibrium Green's Function approach. The necessary process flow for modeling the proposed device

emphasizing the comparative benefits of different channel materials has been described in this paper. Simula-

tion results show that Si device exhibits better threshold voltage and subthreshold swing but GaAs device is

better in on-to-off state current ratio and drain induced barrier lowering (DIBL).

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Day- 01: 24 December 2019, Time: 03.00pm, Technical Session- 02, Parallel Session- 03

Md. Abdul Masud, Md. Moshiur Rahman, Shaneworn Bhadra, Subrata Saha

Abstract – Unsupervised Jearning approach, clustering, performs a set of groups where similar types of

data points are placed in a group. K-meansis apopular clustering algorithm, which is commonly used

in different application because of its simplicity and efficiency. This main drawback of k-meansalgo-

Venue: Room- 307, Session Chairs: Prof. Dr. Syed Akhter Hossain (DIU), Dr. Fida Hasan (UNSW)

Improved k-means Algorithm using Density Estimation

performance of the k-means algorithm on artificially generated and real datasets.

PID: 93

Abstract – With the aim of comprehending inadequacies of basic NEMO (named as Network Mobility Basic Support Protocol), alternate protocols, for example, Proxy Mobile IPv6 (PMIPv6) based NEMO have been proposed via the research community. Similarly, with respect to MIPv6, results to concealment NEMO circumstances dependent on PNEMO have been worked out. Nonetheless, there is little concession to which the most ideal route is to deal with NEMO situations when utilizing PMIPv6. This paper analyzes distinctive flow-enabled Proxy NEMO solutions and characterize numerical model for

PID: 158

Zainalabideen Ali Raheem, Azana Hafizah Mohd Aman, Shayla Islam, Aisha Hassan Abdalla Hashim Abstract - The clouds computing comprises of information inquiry benefits that is versatile and adaptable in costing. Cloud purchasers ordinarily put away secret or fragile information that required to be sheltered and verified. Accordingly, delicate information is encoded for security and classification. A few contemplates have proposed Advanced Encryption Standard (AES) as well as Rivest Shamir

fulfilledthe satisfactory level.

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Chit Su Mon

lights a flow-enabled PMIPv6 NEMO solutions ought to achieve.

Performance Analysis for Cloud Query Encryption

Adleman (RSA) encryption techniques to protect cloud information wellbeing and secureness. However, every encryption strategy gives a particular degree of security which accompanies a contrary degree of proficiency. Henceforth, this exploration will examinations the presentation for both encryption techniques. The exploration arrangement includes Microsoft SQL Server as cloud database reenactment, and a Visual Studio stage to recreate the neighborhood questions. The examination is accomplished for encryption and unscrambling mystery quality. In general, the outcomes showed up

are not noteworthy as every strategy has its own advantages. An Extensive Karnaugh Mapping Tool for Boolean Expression Simplification PID: 175 Md. Saidur Rahman Rifat Hasib. Babe Sultana. Md Gulzar Hussain. Mahmuda Rahman Abstract - The fundamental concept in the design of digital circuits is to reduce the complexity of hardware, make a circuitas simple as possible, which also reduces costs. For obtaining this, we use boolean expression to achieve a lowest possible number ofterms and do not encompass any obsolete couple. Karnaugh Map(K-map) and Quine-McCluskey (QM) approach are the mostpopular specific methods to simplify the Boolean expressions. Inthis research paper, we have developed an extensive Karnaughmapping tool which overcomes the existing research's limitationin this related area. We have simultaneously

considered to ensure that, our extensive K mapping tool is made easier for primarylevel digital logic design learners where they can operate with abig number of variables, and run time is optimal. We

haveimplemented the algorithm and the performance evaluation results carried out by making a

comparison with C-MinimizerAlgorithm and shows that, our extensive K mapping tool outper-forms existing

approaches in terms of computation time and the percentage of relative error is much lower (2%) which is

**Green University of Bangladesh** Rice Leaf Disease Detection Using MachineLearning Techniques PID: 194 Kawcher Ahmed, Tasmia Rahman Shahidi, Sved Md, Irfanul Alam, Sifat Momen Abstract – As one of the top ten rice producing and consuming countries in the world, Bangladesh depends greatly on rice for its economy and for meeting its food demands. To ensure healthy and proper growth of the rice plants it is essential to detectany disease in time and prior to applying required treatment to the affected plants. Since manual detection of diseases costs alarge amount of time and labour, it is inevitably prudent to havean automated system. This paper presents a rice leaf diseased etection system using machine learning approaches. Three of the most common rice plant diseases namely leaf smut, bacterialleaf blight and brown

spot diseases are detected in this work. Clear images of affected rice leaves with white background wereused

as the input. After necessary pre-processing, the dataset wastrained on with a range of different machine learning algorithmsincluding that of KNN(K-Nearest Neighbour), J48(Decision Tree), Naive Bayes and Logistic

Regression. Decision tree algorithm, after 10-fold cross validation, achieved an accuracy of over 97% when

Simulation Based Comparative Stability Analysis Between Conventional and Hybrid

Md. Shahriar Khan Hemel, Akib Mostabe Refat, Kazi Firoz Ahmed, Dewan Mabrur Hasan

Feasibility Study on Solar Bi-facial Technology and Plant Shoot Configuration in

**Abstract** – The proposed research work interfaced traditional grid with renewable microgrid system where renewable sources are working as backup during overload. A Matlab function is developed as controller unit or decision maker for the switching purpose. With the various loads it was observed how grid voltage and frequency acted with respect to time and the stability point difference was analyzed for conventional grid model and hybrid model.

Chowdhury, Alif Mahmud

Perspective of Bangladesh

Power System to Observe the Point of Stability

time due to its vast amount of population where almost 50% inhabitants have no access to electricity. With the growing population electricity demand is rising high gradually. Only conventional methods cannot meet the demand. So, renewable sources should be used to save limited fossil fuels and also to save environment. New methods and technologies should be introduced to mitigate the growing demand. The objectives of this study is to make an analysis between the conventional mono-facial and Bi-facial solar technology and to study feasibility of solar bifacial technology and plant-shoot configuration technology in perspective of Bangladesh. From the study, it is found that using bifacial panel can reduce cost and area with more efficiency. It is also found that plant-shoot configuration technology could be alternative way to save more areas. Most importantly, these solar technolo-

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Day- 02: 25 December 2019, Time: 09.00am, Technical Session- 03, Parallel Session- 01 Venue: Seminar Hall (302), Session Chairs: Prof. Dr. Md. Nurul Huda (UIU), Prof. Dr. Md Abdul Masud (PSTU) Extrapolation, Design and Implementation of a Bangla Web Document Amendable Text

systems and automatic text summary. It is hard to design a scheme for producing summaries of human quality, so many scientists have concentrated on the extraction of sentences or paragraphs, which is a kind of summary. With the assistance of machine-supported technology, an smart method is implemented in this study job to summarize the Bangla texts. This scheme can be commonly used to effectively summarize Bangla text that helps to quickly obtain the focal or central components of

Abstract - With nearly 200 million speakers, Bengali is one of the ten most widely spoken languages in

the globe. Growing internet resources show a definite need for apps in the Bengali language, recovery

Mohammed Mahmudur Rahman, Zinnia Sultana

Convolutional Neural Network Based Skin Lesion Analysis for Classifying Melanoma PID: 26 Shetu Rani Guha, Dr. S. M. Rafizul Hague Abstract - In a human body skin is the core part, which helps to cover the muscles, bones what's more

four passes. On the input Bangla phrases and word frequency calculation, the first two passes conduct

enormous type of skin malignant growth and the extent of these skin diseases is increasing day by day. Recognizing the type of skin disease automatically from the images can assist in the quick diagnosis and enhanced accuracy saving valuable time. Here, a machine learning based technique using convolutional neural network (CNN) for classifying seven types of skin diseases has been proposed. Transfer learning, along with CNN, has been used to improve the classification accuracy on the International Skin Imaging Collaboration 2018 (ISIC) dataset. Evidence of 11% increase in the accuracy by using transfer learning than using only CNN has been found. Compared to some existing works, performance of this proposed method is promising. A New Benchmark on American Sign Language Recognition using Convolutional Neural Network PID: 64

Md Moklesur Rahman, Md. Shafigul Islam, Md. Hafizur Rahman, Roberto Sassi, Massimo W. Rivolta, Md Aktaruzzaman existing methods for ASL recognition. The study has been performed on the alphabet and numerals of four

rithm is random selection of initial cluster centers. This paper proposes an improved k-means, namely, IK-means algorithm to overcomethe main pitfall of k-means. The IK-means algorithm uses Kd-tree data structure to present and store data objects, and applies kernel density estimation technique to locate the densest areas of data points. Initial cluster centers are assigned from the densest areas. The IK-means algorithm produces the clustering results with better accuracy that improves the

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Developing the Bangladeshi National Corpus- a Balanced and Representative Bangla Corpus PID: 40 Khan Md Anwarus Salam, Mahfujur Rahman, Md Mahfuzus Salam Khan Abstract – The need for a balanced, representative national scale corpus has been skyrocketing for the already 'low resource' tagged language-Bangla. Many sporadic empirical works have been done so far in the field of NLP and Computational Linguistics yet, and these are never enough. Moreover, none of these works can bear the best fruit without the help of a standard corpus. To address these issues,

the goal of this research work was set to compile the Bangladeshi National Corpus (BDNC). This

paper proposes the development process of the BDNC (first phase- Bangla monolingual corpus). In this work, the whole task was divided into three major phases, where the goal of the first phase is to build a representative monolingual corpus that will include at least 100 million Bangla words. Whereas, in the second phase, there will be a sub-corpora that will consist of a parallel corpus having 1 million words in Bangla and English. However, at the third and final phase, the parallel corpus will incorporate 15 foreign languages (including English) comprising a weighted corpus size of at least 15 million words. A Sensor based Residential Carbon Monoxide Emission Surveillance System from Least **PID: 19 Developed Country's Perspective** Md. Shihabul Alam. Sinthia Sarker, Ahmed Igbal Pritom, Shihabuzzaman, Arnab Rahman Chowdhury, Mehrab Zaman Chowdhury

implement a device to ensure a sustainable indoor gas surveillance application. In our study, sensor data were examined and measured against different times of a day and a comparative study was presented to find the major contributing factors of indoor air pollution.

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**Abstract** – In recent years, air pollution has become a minatory problem especially for least developed coun-

tries like Bangladesh. The devastating impact of air pollution on third world nation's people's health and the

environment is an indisputable issue. Although much work has been done and improved solutions have been

proposed towards the design and development of outdoor air quality improvement system, very few approach-

es have addressed the same issue for the indoor gas emission supervision. Therefore, today's world is demanding an urgent response to diminishing the rate of residential gas emission. Wireless sensor networks are looking forward with many gas sensors that are now actively used for air quality monitoring. In this paper, we propose a method of indoor CO emission monitoring system given a threshold voltage for the residential level. Our tendency is to closely observe the rate of gas emission in typical households of Bangladesh and

STI 2019 | International Conference on Sustainable Technologies for Industry 4.0 Designing and Simulation of Enhanced Power Generation Device by Employing Foot-PID: 55 bridge System Nahid Hossain Taz, Mirza Fuad Adnan **Abstract** – The planet is confronting an electricity crisis with the variation in limited demand range of natural sources. So the requirement of producing other non-conventional resources that are cheap and feasible is emerging as a significant provocation. To surmount this problem, we require to execute the methods of optimum utilization of conventional sources. This paper exemplifies the procedure of the production of electricity through multiple stages of energy conversion. The whole system focuses on a footbridge, and an archetype model is built and further scrutinized. The initial maneuvering is consuming the pressure produced by physiques and using it into two degrees of energy conversion. Each of the mechanical mechanism comprises three spur gears along with one rack and pinion model. The spur gears are affiliated with shafts and flywheel is connected at the edge of it. Each of the electrical parts comprises a permanent magnet mini DC

generator, 2 charge storing capacitors, 4 voltage sensors, 1 buck converter, 2 BJTs which are used as switch-

Abstract - The term "swarm" uses to reference when expressing a large or dense group of collection of

similar species, while it is being remarked every now and then very special intelligent behavior in nature

and creatures. This paper, thetalk is about a hybridization of the Original Bat Algorithm withextends of some

modifications that disclosed comparatively highpossibilities of optimized result where the echolocation

systemused by micro-bats are used for exploration & exploitation. In themodification, it is being stated Rechenberg's one fifth mutationrule and Gaussian probabilities function. The concern that makethe new

dimension is Doppler Effect in this existing algorithm and fabricated a Modified Bat Algorithm with Doppler

coal. But, these fossil fuels are highly responsible for greenhouse gas emissions (GGE). Carbon

Capture Process (CCP) technologies are expected to play an effective role in the upcoming decades

for reducing greenhouse gas emissions. Integrated Gasification Combined Cycle (IGCC) power plant is

one of the energy generation technologies having the significant potential to capture carbon di-oxides

Effect. Thisalgorithm provides much enhanced results against the OriginalBat Algorithm.

Modified Bat Algorithm with Hybridization of Gaussian Probability and Doppler Effect

Tahsin Aziz, Md. Rashedul Karim Chowdhury, Tashreef Muhammad, Nazmus Sakib

es. lead-acid battery charger and decisively 12 Volt lead-acid batteries.

PID: 70

PID: 193

Feasibility Study of IGCC Power Plant with CCP Technology in Perspective of Bangladesh Md. Rashidul Islam, Md. Sohel, Ahmed Ashraf Tanvir Abstract - Energy, particularly electricity is the most essential and of strategic importance to the national economy. The power generation of Bangladesh highly depends on fossil fuels like natural gas, oil, and

(CO<sub>a</sub>) with low penalties. The main contribution of this research is to find a suitable technology to reduce the massive emission of CO<sub>2</sub> as well as generating electricity which will be helpful to support the features of Industry 4.0 or sustainable technology. Therefore, this paper focuses on the investigation of the feasibility of IGCC power plant with CCP technology in perspective of Bangladesh by comparing it with a conventional Pulverized Coal-Fired power plant based on their performances in terms of capital cost, operating cost, CO<sub>2</sub> emission factor, and net efficiency. In terms of CO<sub>2</sub> emission and net efficiency, the IGCC power plant with CCP technology is a better choice in the long run. The proposed IGCC with CCP outperforms the coal-fired power plant with a net efficiency of 11.55% and almost no emission of CO<sub>2</sub>. Page | 46

Abstract - Textual information exchange, by typing the information and send it to the other end, is one of the most prominent mediums of communication throughout the world. People occupy a lot of time sending emails or additional information on social networking sites where typing the whole information is redundant and time-consuming in this

**Automated Detection of Plant Diseases Using Image Processing and Faster R-CNN** PID: 86 Algorithm Shamse Tasnim Cynthia, Kazi Md. Shahrukh Hossain, Md. Nazmul Hasan, Md. Asaduzzaman, Amit Kumar Das **Abstract** – The economy of Bangladesh highly depends on the field of agriculture and the production of the crops each vear. This is one of the reasons that plant disease identification has become the most crucial factor in cultivating crops. Wrong identification or late identification can cause excessive loss of the production as well as in the financial status of the farmers. Bangladesh being an agriculture-based country, needs to have scientific methods and proper knowledge of this problem. In this condition, providing the farmers some automatic disease detection techniques can reduce their workload and the fear of loss of their production. This paper presents a method that detects diseas-

es from plant leaf images using Tensorflow which is an object detection API, and the model was trained using a faster RCNN method. The rate of accuracy is also calculated. After extensive training on different samples of datasets, our machine learning approach learns gradually and can be more effective in detecting plant diseases. Day- 02: 25 December 2019, Time: 09.00am, Technical Session- 03, Parallel Session- 02

Abstract - A Proton Exchange Membrane Fuel Cell hybrid electric vehicle (PEMFCHEV) occupies several benefits, convenient with respect to a gasoline-powered inner burning machine-based conveyance or a standard hybrid electric vehicle (HEV). This study proposes individual Proton Exchange Membrane Fuel Cell (PEMFC), Battery, and Super-Capacitor (SC) hybrid energy production, which is substantiated within PEMF-CHEV's. Here, the energy supplier consists of individual PEMFC stack at a fixed power, which acts as a prime energy supplier. The nominal voltage supplied by the battery and an SC bank acts as a subsidiary power storage device to support continuous energy to support traction motor for proper synchronous speed. A typical arrangement of FC, Battery, and SC hybrid energy supplier modified in the MATLAB Simulink and simulated. After the simulation, DC-link voltage, dissipated power, and AC output voltage of Inverter has been measured, which in turn delivered to the traction motor to maintain synchronous speed. Thus, the combination of the fuel cell, battery, and super-capacitor to get constant power, is the main achievement of this project. Since state of the art of entire types of energy suppliers employed in FCHEVs, assimilate to the

Day- 01: 24 December 2019, Time: 03.00pm, Technical Session- 02, Parallel Session- 04 Venue: Room- 305, Session Chairs: Prof. Dr. Md. Omar Farrok (AUST), Dr. Ahmed Al Mansur (GUB) PID: 52

PID: 54

applied on the test dataset.

Md. Rashidul Islam, Mohammed Taiseer Alam, Abdullah Al Mamun Abstract - Renewable energy is a popular source of clean and illimitable energy to combat the climate change and reduce its most catastrophic effects. Bangladesh is suffering from energy crisis for a very long

gies will save our environment from pollution and produce more power which will be beneficial to support the features of sustainable technology.

**Green University of Bangladesh** 

**PID: 01** 

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the papers. A excellent instance of a summary scheme is the convention search engine such as Google, representing a compressed search results description. Other examples include summarizing news for Bangla SMS or WAP, news subscriptions addressed by keywords, etc. An algorithm is suggested in this work Bangla Summarization System to extract the Bangla overview that operates on

tokenization and the next two passes conduct phrase scoring and summary generation. with the entire body. These days numerous people are suffering from skin diseases. Melanoma is the

Abstract - The listening or hearing impaired (deaf/dumb) people use a set of signs, called sign language instead of speech for communication among them. However, it is very challenging for non-sign language speakers to communicate with this deaf/dumb community using signs. It is very necessary to develop an application to recognize gestures or actions of sign languages to make easy the communication between the normal and the deaf community. The American Sign Language (ASL) is one of the mostly used sign languages in the World, and considering its importance, there are already existing methods for recognition of ASL with limited accuracies. The objective of this study is to propose a novel model to improve the accuracy of the

publicly available ASL datasets. After preprocessing, the images of alphabet and numerals were fed to a newly proposed convolutional neural network (CNN) model, and the performance of this model was evaluated to recognize the numerals and alphabet of these datasets. The proposed CNN model significantly (9%) improves the recognition accuracy of ASL reported by some existing prominent methods.

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planned PEMFC, Battery, and SC hybrid energy supplier, which clarifies its better competency.

STI 2019 | International Conference on Sustainable Technologies for Industry 4.0 Bangla Word Prediction and Sentence Completion Using GRU: An Extended Version of PID: 82 RNN on N-gram Language Model Omor Faruk Rakib, Shahinur Akter, Md Azim Khan, Amit Kumar Das, Khan Mohammad Habibullah

advanced era. To make textual information exchange more speedy and easier, word predictive systems are launched which can predict the next most likely word so that people do not have to type the next word but select it from the suggested words. In this study, we have proposed a method that can predict the next most appropriate and suitable word in Bangla language, and also it can suggest the corresponding sentence to contribute to this technology of word prediction systems. This proposed approach is, using GRU (Gated Recurrent Unit) based RNN (Recurrent Neural Network) on n-gram dataset to create such language models that can predict the word(s) from the input sequence provided. We have used a corpus dataset, collected from different sources in Bangla language to run the experiments. Compared to the other methods that have been used such as LSTM (Long Short Term Memory) based RNN on

n-gram dataset and Naïve Bayes with Latent Semantic Analysis, our proposed approach gives better performance. It

gives an average accuracy of 99.70% for 5-gram model, 99.24% for 4-gram model, 95.84% for Tri-gram model,

78.15%, and 32.17% respectively for Bi-gram and Uni-gram models on average.

Venue: Room-307, Session Chairs: Prof. Dr. Md. Monjarul Alam (IU), Dr. Ashraful Alam (BRAC Univ) A comparative study of a PEMFC, Battery, Super-capacitor based energy source owing PID: 42 to hybrid vehicle

Md. Munirul Islam Tusher, Mohammad Ehsanul Hogue, Mohammad Jalal Uddin, Arif Mainuddin, Mohammad, Md. Mohin Uddin Talukder

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sensor will open a new horizon for industry 4.0.

Mild-to-Moderate Vibration Sensible Cost-Effective Electricity Generating Floor Tile

Md. Razu Miah, Proma Paul, Sajal Kanti Singha, A.S.M. Iftekhar Uddin

**Abstract** – The current contribution presents the development and implementation of a facile electrici-

ty-generating floor tile which is capable of producing electricity from human footsteps in an economical

way. The proposed harvester (floor tile) consists of two wooden plates, springs, coils, and Neodymi-

um magnets. The production of electricity can be tuned by changing the coil turns, magnetic

field strength and foot pressure. The foot pressure causes the vertical motion of the magnet and

changes the magnetic flux and thus current produce. The generated electricity can be stored in the

battery after rectifying and can be used for powering miniature devices. The proposed harvester

can generate approximately 518.5 mW per footstep under the pressing force of 931 N with a significant low

cost (~USD 50). It is expected that the simplicity, improved functionality and economical features

of the proposed harvester can be a potential mean for the green energy production and can be utilized

Abstract – Uses of Wind energy is rapidly growing because of its attractive contribution on almost zero fuel

cost and lower environmental effects than other conventional sources with ensuring the continuous supply of

energy; also, the energy capturing capacity of wind generator is higher compared to photovoltaic generator.

Bangladesh Power Development Board (BPDB) is operating 50 small wind turbines (the first wind firm in

Bangladesh) each having 20 kW capacities. In this study, we manufacture one small/micro wind turbine in our

Abstract – A highly sensitive D-shaped photonic crystal fiber (PCF) based surface plasmon resonance (SPR) sensor for refractive index (RI) detection is presented in this paper. Plasmonic materials are

deposited outside of the fiber structure to detect the changes in the analyte refractive index. Using the

finite-element method (FEM) method with a circular perfectly matched boundary layer (PML) plasmonic

optical properties of silver (Ag), gold (Au) and copper (Cu) have been simulated, investigated and com-

pared. The proposed D-shaped PCF-based SPR sensor provides maximum wavelength interrogation sensitivity for Ag 8000 nm /RIU, Au 5000 nm /RIU, Cu 5000 nm /RIU (refractive index unit), respectively

and maximum amplitude interrogation sensitivity for Ag of 3858 RIU-1, Au of 911 RIU-1, Cu of 1523 RIU-1.

Industrial 4.0 which refers to the fourth industrial revolution will much more relay on industrial internet of things (IIOT) and machine to machine communication. Therefore, this types of nanoscale SPR

Optical Properties of Plasmonic Material Based on Modified D-Shaped Photonic Crystal Fiber

Micro Wind Turbine as an Alternative Power Source in Bangladesh

efficiently in the field of sustainable development of energy industry and internet of things.

Favez Ahmed Faveem, Asadulla Hil Galib

laboratory and analyze its feasibility with respect to our country wind power sources.

Sarmin Akter Rima, Md.Anwar Hossain, Nguyen Hoang Hai

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PID: 134

**Power System** 

sustainability throughautomatic synchronization.

**Expanding The Area of Light Fidelity** PID: 189 Kabid Hasan Shibly, Sazia Rahman, Md. Tahzib UI Islam **Abstract** – At present, Wireless technology is used all over theworld to ensure the availability of the internet. Although, therouters of Wi-Fi ensure the availability of data within a certainarea it has some speed limitation. Li-Fi is one of the latest wirelesstechnologies, which provides access to the internet using visiblelights. In short Light Fidelity is called Li-Fi. In this process data is transferred through LED lights. Li-Fi also ensures thesafety of data from unauthorized users. But, its coverage area isvery limited. A lot of LED is needed to cover a small area to getmaximum speed and data accuracy. A small room can be coveredwithin this technology. This research emphasizes to reduce thenumber of LEDs and cost-efficient. We are aiming to do this bypositioning the LEDs smartly and Concave mirrors to increasethe area and

volume of light. In Li-fi, the availability of theinternet remains within a small area as it not usable in darkness.By the proposed method, the availability of the internet can beensured in large places, like multiple rooms of a house or hallrooms. With the coming of Industry 4.0, Li-Fi has been exploited as the technology which is definitely will bring industries to thenext level and The proposed method about reducing cost alongwith ensuring internet access in expanded areas. Day- 02: 25 December 2019, Time: 09.00am, Technical Session- 03, Parallel Session- 03 Venue: Room-306, Session Chairs: Prof. Dr. Kazi Muheymin-Us-Sakib (DU), Dr. Selina Sharmin (JnU)

Caregiver and Control Home Appliances

Mouwa Shima, Tahia Tahsin **Abstract** – Most of the cases, the family members act as the caregiver of elderly bedbound people in the middle-class family of Bangladesh. An elderly bedbound people have to share their all needs with their family members. It is challenging for older people to draw the attention of the caregivers by calling with a loud voice to share their needs if caregivers are not close to them. This research is to design an assistive device that can help the bedbound older people to share their requirements with caregivers. The device has two parts: transmitter and receiver. The transmitter device has several PUSH buttons. Every PUSH button is tagged with different needs. When older adults press a PUSH button, the information is transmitted to the receiver device via Bluetooth technology. Then the receiver device plays a different tone for different needs in a buzzer and also shows the essentials in an LED matrix display. Besides, older people can also control home appliances like light, fan, etc. by this device. The device can play a significant role in improving the quality of the daily life of older adults. A UAV-Based Traffic Monitoring System for SmartCities

Development of an Assistive Device for Elderly Bedbound People to Share Needs with

Mohammed Abdul Kader, Mohammed Mahmudur Rahman, Shahnoor Meher, Jannatul

PID: 135 Mahmud Hossain, MD. Arafat Hossain, Farhana Akter Sunny

**Abstract** – The new development of the generation and amodern procedure called Industry 4.0 and its advances in enor-mous information investigation and digital physical frameworks, regardless of others have an obscure potential effect on main-tainability and the earth. Traffic congestion is a major prob-

lemwhich is increasing day by day in developing countries. So trafficmonitoring is becoming a more important issue especially inurban areas for a developing country as well as for the Industry. For the development of smart cities, traffic management is one of the most important features. To reduce traffic congestion forsmart cities, this paper proposes a traffic monitoring systembased on the information captured by Unmanned Aerial Vehicles (UAVs). To capture image and record traffic video, UnmannedAerial Vehicles and on-board cameras are used in our proposed system model. Then, these captured or recorder information aresent and processed in the cloud server and the cloud serversends data to the main server. After providing some backgroundknowledge for implementing UAV, this paper describes theproposed system model elaborately. The user can get update forselecting the best path for avoiding traffic congestion via a webapplication. Finally, some challenges and future directions havediscussed about the UAV traffic monitoring system. Page | 50

Day- 02: 25 December 2019, Time: 09.00am, Technical Session- 03, Parallel Session- 04

Abstract – This paper introduces a method for flow monitoringthrough various supply lines by implement-

ing a mathematicalfunction, majority of which is dependent on standard deviation. Instead of including vari-

ous sensors and numerous complexelectrical connections which is still the common way to measureand

monitor leakage or flow, this project just uses flow measuringsensor to collect data and process the data

in such a way thatactually focuses on user conditions and takes regular variation offlow into account and

modifies its monitoring protocols regularly. The other systems in this sector implies various sensors

toaccurately detect leakage which is good but those systems lackthe ability to collect, process and

store regular data related to the supply line. For this reason, users often have to handle two different

systems simultaneously, one to monitor leakage and theanother for regular data collection regarding

supply. To reducethat effort and cost, this system includes both flow measurement, data storing and monitoring as well as keeps an eye whetherthe flow is regular or there is any leakage or illegal line takenout. In the field of commercial distribution of oil and water, leakage and unauthorized or illegal supply

is one of the mainissues to be considered. Yet now, not many systems has beendeveloped to prevent

or monitor such losses. We have developed a system to monitor and locate line leakage, illegal supply

Tania Afroz, Md. Nasir Uddin Bhuiyan, Prof. Dr. Mohammad Nasir Uddin

Abstract – Internet of Things (IoT) is a kind of system where physical substances are connected to the

Internet for exchanging information. As these physical objects are used in different purposes, it may

require our personal sensitive information which is precious for the intruders. Sometimes intruders

claim themselves as a server or the IoT users to gain access to the valuable database or warehouse

that may be harmful for the persons, society as well as the country. Many researches proposed different authentication protocols absence of mutual authentication and those who implemented mutual authentication didn't fulfill IoT security requirements. To get rid of these problems, we propose a new secure authentication protocol based on Elliptic-curve cryptography (ECC) using ID verifier. We use

ECC rather than traditional Rivest-Shamir-Adleman (RSA), Secure Hash Algorithm (SHA), Ad-

vanced Encryption Standard (AES) because ECC requires less key but provides equivalent security as

others. The proposed protocol can accomplish mutual authentication as well as fulfills the security require-

Abstract - Installing a generator to the infinite bus requiresits voltage, frequency and phase sequence

to be synchronizedwith the bus. This synchronization process is done manually inBangladesh's power

system which possesses the risk of blackoutas well as other security issues. To mitigate such prob-

lems, this paper proposes an automatic synchronization method and a practical demonstration of the method. The proposed methoduses automatic PID controller to synchronize generator's voltageand frequency with the bus whereas phase sequence synchroniza-tion is done conventionally. The demonstration includes a single-phase induction motor as the prime mover of the synchronousgenerator and an Arduino Uno to implement the PID control. Successful synchronization is observed in the demonstration. This is an exemplary work of electric machine control applied torevolutionize maintenance of power system

Automatic Synchronization of a Newly Installed Generator to Infinite Bus of Bangladesh

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ments of IoT. In this proposed protocol all the security requirements have proved by efficient analysis.

Ashraf Siddiquee, Tanveerul Islam, Shadman Shahriar, Bejoy Sikder

A Secure Mutual Authentication Protocol for IoT using ID Verifier Based on ECC

linesand faulty supply lines in a much swift and simpler way whichis cost effective too.

Venue: Room-305, Session Chairs: Prof. Dr. Md. Fayzur Rahman (GUB), Dr. Shamim Kaiser (JU)

A Simpler Design for Liquid Supply Line Leakage Monitoring

Abdullah-Al Nahid, Md. Tajbiul Hasan, Anupam Kumar Bairagi

STI 2019 | International Conference on Sustainable Technologies for Industry

### included in society. With increasing heinous incidents involving women and children, an advanced system is needed to serve the purpose of getting help as soon as possible. At present time, the use of smartphones has increased rapidly, making it possible to use a smartphone efficiently for security or other protective purposes. All the recent atrocious incidents have made us think about to go for the safety issues. The crimes against women can be minimized with the help of our application "LifeCraft". It is an

state-of-the-art work.

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**Green University of Bangladesh** 

Shaheena Sultana

application for android for women's safety though men can also use it at a distress situation. It can be activated by voice command or SOS key. An alert message with location is sent to the user defined numbers in every five minutes until the system is turned off [1]. Many cases remain mysterious due to insufficient evidence. So, we have kept audio recording option to keep evidence. Continuous location tracking, showing the victim safe zone, offline mode is some of the most useful features of this system. Android Apps Success Prediction Before Uploading on Google Play Store PID: 191 Golam Md. Muradul Bashir, Md. Showrov Hossen, Dip Karmoker, Md. Junaeed Kamal **Abstract** – Nowadays among all the mobile apps distribution platform Google Play Store is one of the most attractive and user effective platform for android apps. Every day this platform gets drenched with a huge amount of new android apps. Developers are always trying to make successful their new apps through their skilled independent work or team work. This platform is getting competitive day by day for the developers to retain their place in the market. But this growing competitive sector can be easier for the developers if they can determine the new app's success before uploading it on Google Play Store. As we know that usually an

app's success is determined through the app's user rating and installation number, our work relates with the

LIFECRAFT: An Android Based Application System for Women Safety

Abstract - Women have ensured the stability, progress and long-term development of the nations

throughout the history. If women are subjected to violence and harassment, they cannot be genuinely

Rabbina Ridan Khandoker, Shahreen Khondaker, Fatiha-Tus-Sazia, Fernaz Narin Nur,

purpose to assume the new app's success through the prediction of user rating and installation number before uploading on the Google Play Store. Minimizing Execution Cost of User Application Codes in Mobile Device Cloud PID: 198 Sajeeb Saha, Md. Ahsan Habib, Sujan Sarkar, Md. Abdur Razzaque, Md. Mustafizur Rahman **Abstract** – Mobile Device Cloud (MDC) has become a promising collaborative cloud computing environment that exploits idle resources on nearby mobile devices to execute compute-intensive applications. In the existing MDC system, user tasks are executed by the worker devices either voluntarily or with an amount that leads to overpayment resulting dissatisfaction for both user and worker devices. Therefore, a major challenge is to minimize the execution cost of user codes while supporting sufficient payments to the workers for their used resources. Furthermore, selection of reputed workers becomes more complicated when the workers are having heterogeneous resources. In this paper, we formulate a greedy algorithm to minimize the task execution cost with reputed worker devices, while maintaining the desired quality of execution. The simulation results exhibit that our proposed algorithm can minimize the task execution cost up to 30 % compared to a

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Human Robot Interaction Using Sensor Based HandGestures For Assisting Disable People Masked Face Recognition Using Convolutional Neural Network PID: 197 PID: 95 Badiuzzaman Sabuj, Md. Jahidul Islam, Muhammad Aminur Rahaman Md. Sabbir Ejaz, Md. Rabjul Islam **Abstract** – Recognition from faces is a popular and significant technology in recent years. Face alter-Abstract - Currently, in the world, millions of people aresuffering from paralysis. They have difficulties with walking. Therefore, we have introduced a new type of robot that canhelp these peoples to walk. ations and the presence of different masks make it too much challenging. In the real-world, when a person By using this robot and (hand glovesor wheelchair handle) gesture-based controller, these patientscan is uncooperative with the systems such as in video surveillance then masking is further common

improve their quality of leaving. The proposed robot hastwo parts, one is the gesture controller and, scenarios. For these masks, current face recognition performance degrades. An abundant another is theRobot Wheelchair (RW). One can interact with the robotic-basewheelchair-using number of researches work has been performed for recognizing faces under different conditions like changsensor-based hand gesture. With this human-robot interaction, a patient can quite easily control the ing pose or illumination, degraded images, etc. Still, difficulties created by masks are usually disregarded. The robotand can move freely with this system we can reduce the effortto control the RW, which is very primary concern to this work is about facial masks, and especially to enhance the recognition accuracy of different masked faces. A feasible approach has been proposed that consists of first detecting difficult for paralyzed or oldpersons. Our system can work with about 94% accuracy withvery minimal

as Root Mean Squared Error (RMSE), Mean Absolute Error (MAE). Day- 02: 25 December 2019, Time: 11.30am, Technical Session- 04, Parallel Session- 01 Venue: Room-306, Session Chairs: Prof. Dr. Mohammad Abu Yousuf (JU), Prof. Dr. Md. Hasanul Kabir (JUT) **Degraded Document Enhancement through Binarization Techniques** PID: 49 Moushumi Zaman Bonny, Mohammad Shorif Uddin **Abstract** – Enhancement of degraded documents is one of the significant and challenging research areas. In recent years, several binarization methods are proposed and presented for the improvement of degraded documents, but, most of them are not appropriate for all kinds of degradation. In this paper, we have described some state-of-the-art binarization techniques and compared their performances using DIBCO 2016 to DIBCO 2018 databases. In addition, we briefly discussed about the challenges and possible future works of image binarization.

An Enhanced Similarity Measure for Collaborative Filtering-based Recommender

**Abstract** – In this era of the Internet and ubiquitous computing, huge information is being generated every

moment. Obtaining useful information from the World Wide Web (WWW) has become too difficult. Recommender Systems appear to handle this problem of information overload, to save user effort and time, by

recommending items of potential interest based on other similar users' ratings of the relevant items. Numer-

ous algorithms have been proposed to recommend the potential items of interest. The most widely used methods include collaborative filtering (CF), content-based filtering and combination (hybrid) of two or more

methods to get advantages of them. A CF-based recommender system method follows two main steps: com-

putation of the similarity between two users/items and prediction of the unknown ratings to recommend items

to a user. Several algorithms have been proposed for each of the steps. However, these methods may not be

accurate in some situations, and hence the accuracies of predictions in CF-based RSs can be improved by

overcoming those drawbacks. In this work, we have proposed a new method to compute the similarity

between two users/items to overcome the shortcomings of the existing measures, which in turn will improve

the accuracy of prediction in the CF-based RSs. We evaluate our work, in comparison with other existing

methods, by using a real dataset, based on recommendation accuracies in terms of performance metrics such

Hamid Ghaleb, M. Abdullah-Al-Wadud

**Green University of Bangladesh Vehicle Number Plate Detection and Categorization Using CNNs** PID: 164 Md. Atikuzzaman, Md. Asaduzzaman, Md. Zahidul Islam

and recognition. These phases are completed by adopting a HAAR Featurebased Classifier to detect license

plate, class letter extractor with a proposed method, and Convolution Neural Network for recognizing class

letters. Our given method achieved captivating results in our collected dataset. Our dataset composed of 5500

license plates and it achieved a successful recognition rate of 91.38% with approximately 30 frames/second.

We evaluate our License Plate Detection system performance with 390 test images and we get 96.92% accu-

racy and Class Letter Segmentation has achieved 94.61% with the same size of data. We achieved an overall

Day- 02: 25 December 2019, Time: 11.30am, Technical Session- 04, Parallel Session- 02

researchers to extract specific information. In this regard, the area of finding answers of a specific question

closed domain using wikipedia articles as its knowledge source. The system allows us to generate questions

from wikipedia pages and then to extract answers to questions from wikipedia pages in real time.

Venue: Room-307, Session Chairs: Prof Dr. Md. Obaidur Rahman (DUET), Dr. Md. Abu Layek (JnU)

Abstract - Real-Time Vehicle Number Plate Recognition (ANPR) has been a recurrent subject of research study as a result of many real-world implementations. Yet, numerous of todays works are still not Full-bodied opment ofinformation, and copyright protection is needed for immediateresolution. However, any kind of and consistent in real-world circumstances and rely on various constraints. Our proposed method to detect technology is not existing whichcan conclude the problems of copyright and the protection of privacy continuand recognize license plates in real-time that is particularly designed to work on videos captured by a camera. ously. Existing database watermarking systemshave less privacy protection though the database water-It is a distinct approach that is composed of three main phases like plate detection, class letter segmentation,

the facial regions. The occluded face detection problem has been approached using Multi-Task Cascaded Convolutional Neural Network (MTCNN). Then facial features extraction is performed using the Google FaceNet embedding model. And finally, the classification task has been performed by Support Vector Machine (SVM). Experiments signify that this mentioned approach gives a remarkable performance on masked face recognition. Besides, its performance has been also evaluated within excessive facial masks and found attractive outcomes. Finally, a correlative study also made here for a better understanding.

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unimodal or a multimodal system for reliable and secure identification of human beings. Unimodal biometric systems suffer from numerous difficulties, for example, noisy sensor data, non-universality and spoof attacks etc. Multimodal biometric systems evolved to overcome these difficulties effectively by utilizing and fusing two or more individual modalities. Therefore, this paper presents a strategy to develop a multimodal biometric system by combining the face and iris biometric system with the fusion technique to improve the identification efficiency. This paper also shows the comparison of performance between single biometric system (face, iris) and proposed multimodal biometric system. Compared with some state-of-the-art fusion methods, the proposed method combines two fusion techniques (matching score level fusion and decision level fusion) and shows a significant performance advantage. A Proposed Method For Recognizing Complex Hand Drawn Graphs Using Digital **PID: 148 Geometric Techniques** Bahar Uddin Mahmud, Rajib Das Shuva, Shib Shankar Bose, Md. Mujibur Rahman Majumder, Busrat Jahan

**Abstract** – In order to process a hand drawn input graph and digitize it, various digital geometric

techniques have been used. These techniques utilize the inherent combinatorial properties of the relative

arrangement of the object and grid lines. Aberrations like jaggedness, waviness, etc are overcome using

geometrical techniques. This proposed algorithm uses properties of isothetic cover and digital-geomet-

ric straightness combined with the idea of Farey sequence to identify nodes, annotations and edges.

We convert the input 2D image into pgm format and take this as input to our algorithm. Additionally, we use outer isothetic cover to recognize the nodes and annotations in the graph. The edges are analyzed with the idea of digital straightness combined with Farey sequence and geometric refinement on the seed vectors. Moreover, results of the two phases are finally compiled to associate each annota-

Distinguishing a Person by Face and Iris Using Fusion Approach

Md. Zahidur Rahman, Md. Hasan Hafizur Rahman, Md. Mujibur Rahman Majumdar

Abstract - Biometric system deals with recognizing a person according to his/her specific physiological and

behavioral characteristics. Several physiological and behavioral characteristics have been used for biometric

systems such as face, fingerprints, iris, retina, hand geometry, etc. These characteristics can be used in a

tion with its associated node or edge using nearest distance measure.

STI 2019 | International Conference on Sustainable Technologies for Industry 4.0 A Robust Database Watermarking using Local Differential Privacy PID: 102 Fatema Tuj Johora, Mehdi Hassan Jony, Ms. Sultana Umme Habiba, Ayesha Khatun **Abstract** – Nowadays, privacy protection is built on the hugesharing of big data development and rapid develmarking a research topic that has been widely studied for its feature of copyright tracing. In this paper, we develop an experimentaltechnique, call local differential privacy-based database wa-termarking to protect the privacy as well as the ownership of the database. In the technique, watermarking embeds thedatabase to

determine the location of the database and localdifferential privacy protect the privacy of users. Especiallyour

two proposed methods are the Laplace Mechanism-basedDatabase Watermarking (LMDW) and Randomized

Response-based Database Watermarking (RRDW) for two classical localdifferential privacy mechanisms the

Laplace Mechanism (LM)and the Randomized Response (RR) respectively. Watermarkingis designed with

the distortion created by local differential privacy so that algorithms can reduce the data distortion caused by local differential privacy and maintain the local differential privacy nature which is proven by formal theoretical analysisand experimental evaluation. A sensitive database test suggeststhat the proposed algorithms have

Khondokar Fida Hasan, Tarandeep Kaur, Md. Mhedi Hasan, Yanming Feng

Abstract - Over the past few years, we have experienced greattechnological advancements in the information and

communi-cation field, which has significantly contributed to reshapingthe Intelligent Transportation System (ITS)

concept. Evolvingfrom the platform of a collection of sensors aiming to collectdata, the data exchanged para-

digm among vehicles is shiftedfrom the local network to the cloud. With the introduction ofcloud and edge

computing along with ubiquitous 5G mobilenetwork, it is expected to see the role of Artificial Intelligence(AI)

in data processing and smart decision imminent. So as tofully understand the future automobile scenario in

this vergeof industrial revolution 4.0, it is necessary first of all to get aclear understanding of the cutting-edge

technologies that going totake place in the automotive ecosystem so that the cyber-physicalimpact on transportation system can be measured. CloV, whichis abbreviated from Cognitive Internet of Vehicle, is one of therecently

proposed architectures of the technological evolution intransportation, and it has amassed great attention. It introdu-

cescloud-based artificial intelligence and machine learning intotransportation system. What are the future expectations of CloV?To fully contemplate this architecture's future potentials, andmilestones set to achieve, it is

crucial to understand all thetechnologies that leaned into it. Also, the security issues to meetthe security require-

ments of its practical implementation. Aimingto that, this paper presents the evolution of CloV along with thelayer abstractions to outline the distinctive functional parts of the proposed architecture. It also gives an investigation

of theprime security and privacy issues associated with technological evolution to take measures.

Cognitive Internet of Vehicles: Motivation, Layered Architecture and Security Issues

higher utility and strongconsistency against various watermarking attacks.

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PID: 117

PID: 110

Invited 01

Animesh Das

### Information Extraction from WWW using Structural Approach PID: 59 Md. Zahidur Rahman, Md. Hasan Hafizur Rahman, Md. Faisal Bin Abdul Aziz Abstract – The expeditiously growing World Wide Web (WWW) consists of a large number of data sources from diverse organizations all over the world. The heterogeneous nature of these data poses challenges to

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**Green University of Bangladesh** 

from available web contents is an emerging area of research. Questions are normally expressed in natural language and for finding answers to natural language questions from web contents; Question Answering (QA) is the most promising framework, which can be implemented on either closed domain or open domain. In this paper, we propose an automated QA system which can answer binary and wh-interrogated questions about

successful recognition rate of 90.90% with real-time performance.

An Unorthodox Way of Farming Without Intermediaries Through Blockchain PID: 84 Shovon Paul, Jubair Islam Joy, Shaila Sarker, Abdullah - Al - Haris Shakib, Sharif Ahmed, **Abstract** – Blockchain technology has the scope of creating a decentralized environment where any third-party organization does not manipulate transactions, and the transaction is recorded in a public ledger permanently within the first-ever occurrence. The backbone of the developing countries' economy depends on farming. When farmers sell their crops, they don't get their desired money following their hard work due to the existence of a loop that always creates an artificial crisis, which causes rise to the price of the farming goods. As a result, the farmer doesn't get this extra money as a middle-man between the farmers and the consumers are taking this extra money out. Though modern farming involves science and technology, still it is centralized and not transparent to all. Based on blockchain technology, the study proposed a decentralized agricultural platform, named KHET to resolve the mentioned issue. This paper constitutes trust and decentralization between agricultural stakeholders such as farmers, supply companies, and markets.

**Green University of Bangladesh** Day- 02: 25 December 2019, Time: 11.30am, Technical Session- 04, Parallel Session- 03 Venue: Room-305, Session Chairs: Prof. Dr. Muhammad Mahbub Alam (IUT), Prof. Dr. Chowdhury Farhan Ahmed (GUB) Execution Delay-aware Task Assignment in Mobile Edge Cloud and Internet Cloud **PID: 168** Jargis Ahmed, Md. Mahir Ashhab, Md. Abdur Razzaque, Md. Mustafizur Rahman **Abstract** – Mobile Edge Cloud (MEC) provides computationability close proximate of user compared to Internet Cloud (IC), which ensures flexibility and reliability in executing codes onmobile devices. Offloading resource hungry mobile application to MEC by mobile devices for computation is challenging.

On the other hand, maintaining task provisioning within delayconstraint is important too. This assign-

performanceevaluation of the proposed algorithm indicates significant im-provement in successful tasks

Farjana Mahia, Arpita Rani Dey, Md Abdul Masud, Mohammad Sultan Mahmud

Abstract - Autoregressive integrated moving average, ARIMA, is a popular technique, which is

used to fit time series data for prediction and forecasting. This paper proposes ARIMA models

with different sets of parameters for forecasting electricity consumption. The three ARIMA models,

which are quite good and robust to develop a reliable model, are investigated to forecast electricity con-

sumption for providing the required level of performance. The best fitted model, effective and reliable

approach, and network structure are determined according to the prediction performance. For this

purpose, we use synthetic dataset and electricity consumption data in industries at Guangdong province

in China. The experimental results show that the ARIMA(1,1,1) has high precision, stable predictions

ment policy still requiresimprovement in decreasing completion time of task and thusproviding better Quality of Experience (QoE) for users. In this paper, we formulated a delay-aware task assignment as anoptimization problem. The optimal assignment of task is IntegerLinear Problem (ILP) and NP-Complete. As optimal solution istime costly, hence we proposed a heuristic algorithm, which isdone by cooperating the MEC and IC servers to provide feasibletask assignment within delay constraint. Extensive

execution and better QoE can beachieved compared to existing state-of-the-art works.

Forecasting Electricity Consumption using ARIMA Model

and suitable for predicting electricity consumption. The forecasting results are essential to manage the required electricity demand in various kind of industries and other sectors. Performance Evaluation of Cloud Radio Access Network with Hybrid Power Supplies PID: 72 Abu Jahid, Khondoker Ziaul Islam, Md. Sanwar Hossain, Md. Kamrul Hasan Monju, Md. Fayzur Rahman Abstract – With the unprecedented augmentation of mobilecommunications and the advancement of new technologies, en-ergy efficiency (EE) has developed a severe apprehension ofmaintaining the profitability of telecom operators by means of reducing the operational expenditure with minimum atmosphericdeterioration as well. Base stations (BSs) are the prime energyconsumer in the telecom sector. Therefore, lowering the energyconsumption of BSs in the cellular networks has recently become great concern by the telecom operators and researchers. As a consequence, attempts have been taken behind reducing BSenergy consumption and to find expedient ways for better EE.In this paper, we propose renewable energy powered cloudradio access network (C-RAN) architecture for achieving longterm

sustainable green cellular networks. Several performancemetrics under the telecommunication system

namely equipmentlevel and network-level are investigated in the design frameworkaiming to enhance overall

EE, Moreover, MATLAB based Monte-Carlo simulations have been accomplished for checking outEE

performance of the proposed network fluctuating systemcriterions for example transmission bandwidth, the number of thetransceiver, solar module capacity, etc. in consideration of the realtraffic demand. Analytical

outcomes validate the performance of the recommended scheme over the conventional one.

Industrial Wastewater Treatment and Solid waste Disposal for Sustainable Textile Invited 02 Sector of Bangladesh. Professor Dr. Ummul Khair Fatema **Abstract** – Bangladesh is one of the leading RMG producer in the world. The Government of Bangladesh plan

to double the total revenues from the textile industry from about US\$ 25 billion (2015) to about US\$ 50 billion

by 2021. Most of the textile and garment industries are located in Dhaka and Chattogram. The existing textile production is associated with tremendous environmental pollution, mainly to the discharge of insufficiently

treated wastewater and disposal of solid waste. The current consumption of water in wet processing ranges

from 50 to 200 liter/kg followed by washing and finishing operations and subsequently it generates million

tons of wastewater and huge amount of sludge per year. As water is becoming scarcer; we must address the

issue from water security perspective. Furthermore, most of the industries do not comply with existing social

and environmental standards such as for occupational health and safety, chemicals management, minimiza-

tion of water consumption, wastewater discharge to natural waters and proper disposal of sludge. Being aware of the burning environmental problem, it is anticipated that the envisaged growth will only be achieved if corresponding efforts are undertaken to better protect the environment as a whole and if the entire nation strives for sustainable development goals (SDGs) by 2030. The proper implementation of techniques to minimize pollution at source (process optimization) as well as end-of-pipe measures (pollution mitigation) may bring environmental protection and sustainability along the entire textile value-added chain. Therefore, our focus should be on economic consumption of natural resources, cleaner production, chemical management, 6R approach etc. and hence fostering the understanding of responsible and sustainable management in order to strive towards a sustainable economy.

A Proposed Secure Mobile Money Transfer System for SME in Bangladesh: An Industry 4.0 Perspective Ivolita Islam, Kazi Md. Munim, Muhammad Nazrul Islam, Md. Mahboob Karim **Abstract** - Nowadays, the fourth industrial revolution (Indus-try 4.0) sets new goals for production and impacts on industrialvalues. Adopting Industry 4.0 in Small and Medium Enterprises(SMEs) provides new paradigms for industrial management toenhance the business policies and outcomes. Payments in SMEsprimarily follow the existing banking system in Bangladesh. Again, though the mobile money transferring system is a conve-nient and easy way, it required to be highly secure and reliable. Thus, an automated

and secured mobile money transfer canbe introduced towards adopting the Industry 4.0 in SMEs inBangladesh. Therefore, the objective of this article is to propose a money transfer system to automate and enhance the security ofpayment process for SMEs in Bangladesh. To attain this objective, a conceptual framework from an Industry 4.0 perspective alongwith required algorithm is proposed here. The proposed systemincludes iris verification technique to authenticate a user uniquelyand consistently over the time. The theoretical justification and expected benefits are also discussed. Page | 56 STI 2019 | International Conference on Sustainable Technologies for Industry 4.0

online learning is crucial as the student's success in online courses heavily depends on his/her state of mind. In our previous work, we used facial expressions labeled as engaged and not-engaged for student's engagement detection. In this paper, we use student behavioral (on-task and off-task) and emotional (satisfied, bored, and confused) information for engagement detection. Five models of convolutional neural networks (CNN) have been analyzed for the behavioral and emotional dimensions detection to

detect student engagement in online learning. The models include all convolutional network (All-CNN),

network-in-network (NiN-CNN), very deepconvolutional network (VD-CNN), conv-pool convolutional

neural network (CP-CNN), and a proposed model (CM-CNN) combing some special features from the above

models. We used the dataset, Dataset for the Affective States in E-Environments (DAiSEE), for the

performance evaluation with a new labeling. Experimental results show that the behavioral and emotional

dimension-based analysis provides a high accuracy of engagement detection.

method will facilitate the sustainable technology in textiles.

**Curriculum of Bangladesh** 

Prof. Dr. Lal Mohan Baral

Abstract - Online learning plays a key role in current education system. Engagement detection in

A Two-Stage Algorithm for Engagement Detection in Online Learning

Saswat Dash, M. Ali Akber Dewan, Mahbub Murshed, Fuhua Lin, M. Abdullah-Al-Wadud,

Day- 02: 25 December 2019, Time: 11.30am, Technical Session- 02, Parallel Session- 04 Venue: Seminar Hall (302), Session Chairs: Prof. Dr. Nitai Chandra Sutradhar (GUB), Prof. Dr. Ismail Chowdhury (GUB) Salt Free Dyeing of Cotton Fabric with Reactive Dyes by Using Cationic Fixing Agent PID: 151 Md. Mahbubur Rahman, Md. Mutasim Uddin, Dr. Jagannath Biswas Abstract - Dyeing of cotton fabric with reactive dyes, salts are needed for exhaustion process of dyes. But salt makes the effluent hazardous for the environment. In this study we have dyed cotton fabric without salt which will be economic, non-toxic and environment friendly. The cotton fabric treated with cationic fixing agents without electrolytes shows good results. The color fastness of these dyeing is equal or superior to that of some dyes on untreated cotton. All concentration of soda (10gm/l, 15 gm/l and 20 gm/l) shows similar results. So, 10 gm/l soda ash is a good choice for economic and commercial production. Fastness properties are adequate and quite comparable with conventionally dyed samples. As a result, industrial practice of this

**Abstract** – At present the textile industries of Bangladesh is contributing positively for keeping up its sustain-

able economic growth. To make textile industries sustainable through achieving the United Nations Sustain-

able Development Goals (UN SDGs), the quality enhancement of Textile Engineering education is the great

concern for producing skilled textile graduates. This talk will explore a recent research on sustainability

relevant to Textile Engineering education which includes sustainability gaps analysis that are exist in the pres-

ent textile engineering education of Bangladesh and identification of the relevant sustainability issues for

incorporating with the existing syllabus in order to reduce the existing gaps. Both quantitative and qualitative

data have been collected from different stakeholders through survey to meet up the national requirements and

from foreign experts through seminar, symposium and workshop to meet up the international requirements.

The outcome of this study will contribute to the academics and policy makers to take the necessary steps

towards enhancing the quality of textile engineering education for producing skilled textile graduate.

**ABSTRACTS: Interactive Poster Session (D2IPS)** 

Day- 02: 25 December 2019, Time: 12.45pm, D2IPS

Dr. Md. Anwar Hossain (GUB), Dr. Jagannath Biswas (GUB)

proposed system compared to the state-of-the-art works.

An Ingenious Approach of Incorporating Sustainability Issues within Textile Engineering

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STI 2019 | International Conference on Sustainable Technologies for Industry 4.0

A Smart Home Automation Panel with Earthquake Detection Capability PID: 10 Md. Razu Miah, Sajal Kanti Singha **Abstract** – Herein, a smart automation panel for controlling an entire load of a home has been proposed by utilizing the Radio Frequency (RF) and Global Service for Mobile communication (GSM) technologies including the earthquake detection capability. With the help of various sensors entangled within the automation panel smoke, fire, gas leakage and earthquake can be detected. The reflected sound waves can be received by the ultrasonic sensor from a liquid surface while vibrating in the earthquake detector sub-panel. A Short Message Service (SMS) can be sent to the owner of the home with the help of GSM module when any of the danger occurs. Besides the automated control, the owner can able to disconnect the electric connection of the home by sending an SMS. Smart Dual Axis Sun Tracking System For Concentrated Solar Dish Using Linear Actuator PID: 23 Md. Mamun Hossain, Tajdique Ahmed, Shuvra Saha, Dr. Mehedi Bin Mohammad

**Abstract** – In recent times, electricity generation using solar thermal or concentrated solar power (CSP) is evolving towards large scale electricity production through more efficient conversion systems and cheaper components with longer life. As compared to renewable electricity from wind turbines and solar photovoltaic (PV), CSP plants have the advantage of being able to integrate thermal energy storage or hybridization to supply electricity around the clock, regardless of variations in solar radiation. The collector or reflector system consists of a parabolic dish that concentrates the Sun's rays to a receiver placed at the focal point; this receiver converts the solar energy into electricity using Stirling engine. Accurate sun tracking requires dual axis tracking which involve azimuth and tilt angle optimization. This can be easily achieved using linear actuators. The objective of this project work is to design, model and test a dual axis mirror controller for solar thermal systems that will ensure maximum utilization of Sun rays throughout the day time. The CSP reflector or mirror is controlled using microcontroller (Arduino). Light sensors (LDR) are used to detect the intensity of the Sun rays, and the CSP will be oriented accordingly using two linear actuators with minimum vibration. The linear actuators are controlled using Arduino. Based on the Sun ray's direction and intensity, the required position of the CSP is calculated in terms of azimuth and tilt angles. Accordingly, the CSP is moved using two linear actuators one for azimuth and another for tilt. The maximum weight capacity is approx. 100kg without vibration.

Mobility Aware Optimal Placement of Virtual Network Functions in 5G

Palash Roy, Anika Tahsin, Tamal Adhikary, Sujan Sarkar, Md. Abdur Razzaque

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**Abstract** – Virtual Network Functions (VNFs) in cloud servers of Fifth Generation (5G) network systems are responsible for executing offloaded codes from mobile users. Placement of VNFs in the cloud is very complicated to get on-time service from the cloud due to users mobility. Minimizing the number of VNF relocations and the communication delay are the two main design goals for VNF placement; However, they do oppose each other. In this paper, we have developed an optimization framework to trade-off between the aforementioned parameters. Our performance analysis depicts that the user satisfaction is improved significantly in our

Venue: Seminar Hall (302), Judges Panel: Prof. Dr. Hafiz Md. Hasan Babu (National Univ), Prof. Dr. Md. Monirul Islam (GUB)

STI 2019 | International Conference on Sustainable Technologies for Industry 4.0 Bangla Handwriting Recognition using Fuzzy Filter based Convolutional Neural Network Md. Easin Arafat Chowdhury, Md. Kamrul Hasan, Md. Ashaduzzaman, Md. Mahin and Muhammad Aminur Rahaman **Abstract** – Handwritten recognition is a significant application in many areas of analysis, along with machine learning, image analysis, and pattern recognition. Due to different handwriting shapes, variations, and some complicated compound letters, the recognition of Bangla handwriting scripts is a truly difficult challenge. In this paper, we introduced a model of recognition for handwritten Bangla characters and digits using a filter called Fuzzy Filter (FF) on the configuration of the Convolutional Neural Network (CNN). Previously dropout layers of CNN based recognition system dropped out pixels based on specific threshold values. In our system, we introduced FF before each of the dropout filters. As a result, our system works more accurately and faster

ual cluster or classes. The system applies the prediction technique in parallel to predict the string in the 1st cluster based on recognized classes. The system is trained using 68 classes in which each class contains 100 samples. The system is tested using another set of 68 classes that have a total of 68\*100=6800 images having the recognition accuracy of 96.62%. The system is also tested using 500 vehicle Bangla number plate achieving the mean recognition accuracy of 94.5% with a mean computation cost of 35.80 ms/f. **Duplicate Contents Restriction Algorithm for Copied Post on Online Social Network** PID: 204 Md. Nasir Hossain Hridoy, Mohammad Mohitul Islam, Ruhul Amin, Babe Sultanax **Abstract** – In this research paper, we have considered to detect duplicate contents and restrict this which are uploading in the online social network. In the first step, we have identified the problem's solution and developed an algorithm named Duplicate Contents Restriction Algorithm which is restricted to post the copied

contents in online social networks like Facebook. Then, we have implemented it for verifying our approach

and the outcomes are enriched at a satisfactory level. Our proposed algorithm can handle large size of strings

(more than 10000 bytes) with optimal computation time.

applies inter co-relation and auto-correction function to recognize each cluster assigning by distinct classes by

calculating the maximum similarity between test and trained contour vectors which are extracted from individ-

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Excellency to reduce the corrosion in copper such as Morinda tincoria, etc. Distinguish Features of Smart Irrigation System using Solar Power **PID: 57** Suvo Pall, Apu Mondal, Sadia Yasmin Abstract – In the current age of technology, a lot of researches have been conducted for the betterment of cultivation system. As agriculture is one of the major sectors for the economy of Bangladesh, it should be developed enough for satisfying the upgrading demand of food production in a proper way. This paper describes the use of soil moisture sensor and ultrasonic sensor for the measurement of moisture in the soil and for the detection of insects in the agriculture field respectively and ensure safety by monitoring the field from remote places with the help of night vision system. In this paper, we have worked on ultrasonic sensor by placing them in the four-side (east, west, north, and south) to protect agriculture field from insects. Most

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**Abstract** – Automatically authentication of vehicle registration issues, license registration, emission testing, and insurance validity is an application of smart city development. Traffic police do these documents checking using license plate checking or verifying documents after stopping the driver which is very annoying for both the drivers and polices. To solve this difficulty we proposed a new idea to do these validating using Global Positioning System (GPS) location of the vehicle.

velocity of that vehicle, traffic of that place and so on. With all these factors number of passenger system also included in this paper with the hope that the bus will be maintained an exact time as well as it will remove the

Smart Traffic Vehicle Monitoring & Authenticating System using GPS



Notes

\* স্থাপিত ক্ষমতাঃ ১৬৯০ মেগাওয়াট

\* বর্তমান উৎপাদন ক্ষমতাঃ ১৫৬৮ মেগাওয়াট

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presented papers will be published in the IEEE Explore digital library. Papers presenting original research are being sought in all areas of Computer. Electrical and Textile engineering fields including (but not limited to): 02 Electromes, 1 on Communication Systems 01 Networking and Security Systems 03 Textile Engineering Artificial Intelligence and Machine Learning
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The Industry 4.0 refers to Fourth Industrial Revolution that encompasses smart industries, smart grids, intelligent transportation, real-time healthcare, etc. bolstered by automation and cyber-physical systems. Detail studies and researches are required to design and develop sustainable technologies for Industry 4.0 since they depend on complex relation among human, system and objects. STI 2019 welcomes researchers, industry professionals and practitioners to display their scientific achievements and sustainable innovative industrial developments in the fields of computer science & engineering, electrical & electronic engineering, textile

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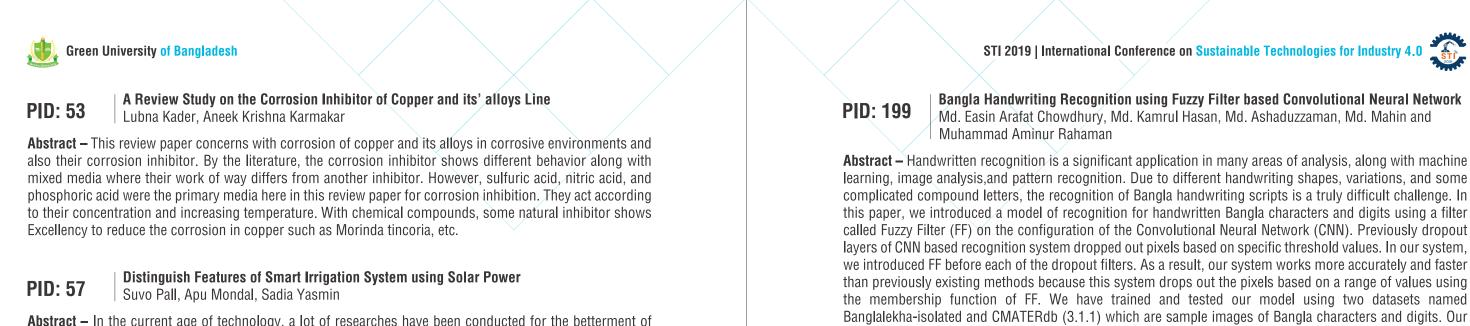
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engineering, robotics and cyber-physical systems that are entering into Industry 4.0. STI 2020 will be held at the permanent campus of Green University of Bangladesh, Purbachal American City, Rupgonj, Dhaka, Bangladesh during 19-20 December 2020. We are seeking original high-quality submissions addressing innovative research. All submissions to STI 2020 will be blind peer reviewed. Accepted and · Reduced Registration Fees for IEEE Members Technical Program Committee (1 Dr. Md. Anwar Hossain Conference Banquet and Cultural Event Dr. Muhammad Aminur Rahaman Dr. Muhammad Aminur Rahaman Accommodation and Transport Chair Keynote and Invited Speeches · Technical Paper Presentation Interactive Poster Session Industrial Talks · Workshops and Tutorials · Innovative Project Exhibition **Submission Link** https://easychair.org/conferences/?conf=sti2020 Sponsored by Technical Co-sponsors **IEEE** Green



of the time, large amount of crops is destroyed because of insects. By using this system, users can be identified those insects at an early stage and also will get an alert message in their phone through the Global System for Mobile Communications (GSM) module. If the users want to kill those insects, they can spray chemical in the field by sending command from their mobile phone to the microcontroller to turn on the sprinkle motor. Moreover, when the soil moisture is less than a certain level, by seeing the message on the phone, user can decide whether water is needed in the field or not and can also turn on or off the pump to control the moisture level of the soil. Another innovative feature of this paper is 360° rotatable 8 megapixel Sony sensor night vision camera which will ensure safety for the irrigation field by monitoring the field all the time. The whole system of this project has been operated through the solar power so the maintenance cost is low. Crime Detection and Classification using Ensemble k-NN PID: 92 Nahary Jannath, Md Abdul Masud, Tanusire Roy, Moinul Islam Sayed Abstract - Crime is the most common affair in Bangladesh. There are different kinds of crimes such as drugs, dowry, theft, sex crime, early marriage, murder, violent of crime, and so on are happened in various social aspects. These criminal activities are hampered in normal life, so it is an essential task for the public security

section to prevent criminal activities. It is really hard to detect and classify these types of crime manually.

Machine learning methods are significant tools to mitigate the criminal activities by detecting and identifying

the nature of crime, which occurs frequently. This paper presents the crime data classification and detection

with ensemble k-nearest neighbors, Ek-NN. The Ek-NN method is a combination of multiple classifiers, which

uses random feature subsets for building diversification of data. We collected about 200 criminal records in

2018 from Dumki thana, Patuakhali district in Bangladesh. The experimental results show that the Ek-NN

algorithm outperforms the k-nearest neighbors, k-NN, in classification of crime data.

Self-acting Bus Schedule Controlling Using Fuzzy Logic PID: 205 Hafiza Akter Munira, Angona Biswas Abstract - Transportation is an important issue in every country. Bus is a common vehicle for the people. It is very prevalent that the bus schedule is not maintained in our conventional way. This issue is under fact-finding how to improve this condition. To get rid of this kind of predicament different idea is implemented with fuzzy logic in this paper. Different factor controls this problem such as the appropriate departure time,

K M Farhat Snigdah, Md Gulzar Hussain

adversity of the passengers. For that the mathematical model is developed with fuzzy logic.

**Notes** 

proposed system achieved an accuracy of 98.97% with a minimal level of computational cost. Real-Time Recognition of Bangla Vehicles Number Plate Based on Clustering and PID: 202 **Prediction Technique** Masud Pervej, Sabuj Das, Md. Jahidul Islam, Md Mahin and Muhammad Aminur Rahaman **Abstract** – Real-time recognition of vehicle number plate is an important topic in the modern research area. In relevant for Bangladeshi vehicles number plate detection and recognition is also on board. In this paper, authors have proposed and developed a modern and efficient technique for real-time recognition of Bangla vehicle number plate based on clustering and prediction technique. These techniques are divided into major four parts that work on specific properties on the license plate. Plate detection, plate clustering, individual cluster recognition, and prediction of the string are the main parts of the framework. At first, the system localizes the registration plate, then segments the plate and clusters the plate into five parts. In each part, the system

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Wishes you All The Best

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