STI 2019

International Conference on Sustainable Technologies for Industry 4.0

24-25 December 2019

Venue: Permanent Campus, Green University of Bangladesh
Dhaka, Bangladesh

Organized by:

Green University

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Green University of Bangladesh

STI 2019

International Conference on Sustainable Technologies for Industry 4.0

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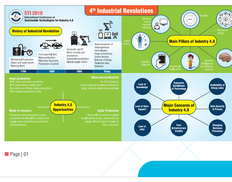

MESSAGE

Member
University Grants Commission of Bangladesh

I am delighted to know that the International Conference on Sustainable Technologies for Industry 4.0 (STI 2019) is going to be held from 24-25 December 2019 at permanent campus of Green University of Bangladesh, Purbachal American City, Rupgonj, Dhn 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 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

MESSAGE

Chairman
Board of Trustees
Green University of Bangladesh

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

In fourth-generation industrial revolution, the use of technology is not enough for us, innovation and development of sustainable technology is a must, and that's a timely milestone to be achieved by our 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 to develop 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 family.

To the best of my knowledge, Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML), Big Data Processing, Cloud Computing, Smart Grid, Real-Time monitoring and control systems, and computer aided design and manufacturing technologies are the driving forces of fourth industrial revolution. I hope STI 2019 will be the vitamin for researchers, industry professionals and practitioners to represent their scientific achievements and sustainable innovations in industrial developments in the relevant fields.

I pay special thanks to dean, chairpersons, professors, all teachers and staffs of the Faculty of Science & Engineering 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-Mamun

MESSAGE

Vice Chancellor
Green University of Bangladesh

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 targeted on the development of sustainable technologies is a big one.

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

WELCOME MESSAGE

General Chair
STI 2019

Welcome to the 1st International Conference on Sustainable Technologies for Industry 4.0 (STI) 2019, taking 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 79 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 Manufacturing Technologies which are the driving forces of fourth industrial revolution.

Due to the digitalization of production, we are in the midst of a major change in the way we produce and distribute goods and services. Our mission is to overcome this by a called Industry 4.0 and the Internet of Things and Services. Starting from mechatronics, 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 automation.

The STI 2019 conference aims to present theoretical and empirical studies that contribute to developing a better 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, boosting 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. 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 Kawsar, from Nokia Bell Labs, Belgium. Prof Celia Shahnaz, from Bangladesh University of Engineering and Technology. Prof Jalil Khondaker, from Dhurmotoli University of Applied Sciences, Germany. Prof Atiqur R. Ahad from Osaka University, Japan, Prof Celia Shahnaz from BUET, Bangladesh and Prof. Latfur 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

MESSAGE

Chair
IEEE BDS
Professor, BUET

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 Bangladesh on December 24-25, 2019.

It is a great milestone that as the 2018 Chair of IEEE BDS, I led a bid submission for organizing Region 10 (R10) Annual Conference (IEEE TENCON) in Bangladesh and successfully hosted IEEE TENCON 2017 in Penang, Malaysia. Chair (2015-16) and in 2018, IEEE BDS has won the opportunity to organize TENSYMP 2020 in Dhaka. In 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 IEEE Region 10 Humanitarian Technology Conference (R10HTC) in Dhaka, Bangladesh in 2017. Other conferences are: BIGSTHCON: IEEE International Conference on Biomedical Engineering, Computer and Information Technology for Health 2019, PEESACON: IEEE International Conference on Power Electrical, Electronics and Industrial Applications 2019, RAAICON: IEEE International Conference on Robotics, Automation, Artificial-Intelligence & Internet-of-Things 2019, SPACSCON: IEEE International Conference on Signal Processing, Information, Communication & Systems 2019, ICSTSN: International Conference on Sustainable Technologies for Industry 4.0, 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, WOWEC: Women Engineers 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 19 international keynote speakers from 10 countries delivered their speeches. More than 200 participants from 19 countries authors and 121 reviewers were involved from the beginning. I have received 20th 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 recognition and accepted the award in R10 Student/Young Professionals/Women In Engineering Congress on 31st August, 2018. Indonesia. This is 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 Recruitment and Retention Performance Award" 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 in IEEE BDS, the Technical Co-Chair of IEEE WIECON-ECE 2017 in IEEE BDS and IEEE WIECON-ECE 2018 was jointly organized by IEEE BDS and IEEE Bangalore Section. IEEE WIECON-ECE 2019 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 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 awarded at 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,

KEYNOTE SPEAKER

Sajal K. Das
ERC Fellow
Missouri University of Science and Technology, USA

From Smart Sensing to Smart Living

Abstract

We live in an era in which our physical and personal environments are becoming increasingly intertwined and smarter due to the advent of pervasive sensing, wireless communications, computing, and actuation technologies. Indeed our daily living in smart cities and connected communities depend on a wide variety of smart service systems and cyber-physical infrastructures, such as smart energy, smart transportation, smart healthcare, etc. Alongside, the availability of low-cost wireless sensors, Internet of Things (IoTs) and rich mobile devices (smartphones) are empowering humans with fine-grained information and opinion collection through crowdsensing about events of interest, resulting in actionable inferences and decisions. This synergy has led to the cyber-physical-social (CPS) convergence with human in the loop that exhibits complex interactions, inter-dependencies and adaptations between engineered or natural systems and human users with a goal to improve the quality of life and experience in what we call smart living. However, the main challenges in realizing the full potential of smart living are the following: scalability, energy efficiency, resource optimization and situation awareness using sensors, IoTs and CPS networks. This talk will highlight unique research 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 science, cyber-physical systems, and cyber security. He has published over 700 papers, received 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.

KEYNOTE SPEAKER

Muhammad H. Rashid
IEEE Fellow
Professor, Electrical Engineering
Florida Polytechnic University, USA

Power Electronics Applications In Renewable Energy

Abstract

Power electronics has developed continuously over the years and are finding increasing applications. There are many power converters 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 renewable energy technologies today are well developed, reliable, and cost competitive with the conventional fuel generation. 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 Nevada as Professor and Director of UNLV/NP 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 Engineering and 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 professional ethics. He has published 32 books and is now working on a book and more than 160 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.

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

KEYNOTE SPEAKER

Deng Zhongmin
Professor and Executive Director
Hubei Modern Textile Engineering Research Center, China

The Warp Knitting Technology on the Seamless Process Design Method

Abstract

Warp knitted seamless products because of its shape, light and, beautiful pattern stereo etc excellent characteristic and developing rapidly.This article in the seamless technology molding principle, on the basis of analysis of the realization of the fabric bottomless.And with WUYANG TEXTILE MACHINERY WE296 seamless knitting machine as an example, the warp knitted seamless molding fabric design and process design to explore, in the technological design process fully consider the models, such as raw material, the organization 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.

Biography

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 Clothing", "Research on Intelligent Production Technology of Warp Knitting Machine", "Research on Intelligent 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.

Alamgir Hossain
Professor of Artificial Intelligence
Teesside University
UK

AI, Big Data & Cyber Security to Empower & Enable Industry 4.0

Abstract

AI (artificial intelligence) is one of the most important technologies 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 self-driven development to empower and enable industries/businesses to address the Industry 4.0 challenges. Using practical example of process industry, he will demonstrate the role of digital twin (DTs) combining the physics-based and data-driven modelling of artificial intelligence, process optimisation, machine learning, big data analytics and risk analytics of deployed cyberspace.

Biography

Professor Alamgir Hossain received his PhD from the Department of Automatic Control and Systems Engineering, University of Sheffield, UK. He is currently working as a Professor of Artificial Intelligence at the 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 investigator and has published over 200 papers. He is also the author/co-author of five textbooks and currently supervises 15 countries. He has published over 300 research articles including 50 research articles as a co-author with the academics of 12 countries.

KEYNOTE SPEAKER

Fahim Kawsar
Director
Pervasive Systems Research
Nokia Bell Labs, Cambridge, UK

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

Abstract

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 in unprecedented ways paving opportunities for a new generation of human centric services. 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 ubiquitous computational platform to learn, infer, and augment human behaviour and to design ultra-personal computational experience.

Biography

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-founder UbiComp/ISWC Labs publications, TedX speakers, is an ACEC 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 impressions on his research.

KEYNOTE SPEAKER

Oksam Chae
Professor of Computer Vision
Kyung Hee University
South Korea

Image Processing Software Development: Issues, Solutions, Applications

Abstract

Recent technological advances created a steady influx of image data generation in many areas including medical imaging, surveillance, HCI, and entertainment. This in turn has led to a rapid development in the analysis of these huge volume and still rapidly growing datasets made the perception technology as a vital part of these developments and it is expected to play a key role in the upcoming fourth industrial revolution. 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 deep learning technology and approaches and popularity of open source development platforms provide some solutions to this problem by offering reusable software libraries and components. However, there is still a huge demand/scope for more general-purpose 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 processing/computer vision for industrial applications. In this talk, I will share the experiences of these developments to demonstrate how an 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 HobVision developed by my research group to systematically generate, test, and evaluate 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 first Korean character recognition system in 1982 and founded Software Research Lab. and Real-time 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 facial 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 develop software components that can be reused in many areas. He developed the software development environment to manage them systematically, and produce components by simply connecting those components. As a result of his long efforts, he introduced the integrated image software development environment, called HobVision, which was appointed (selected/commended/etc?) 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.

KEYNOTE SPEAKER

Rahamatullah Khondoker
Professor
Darmstadt University of Applied Sciences
Germany

Who is Driving Your Car?

Abstract

Autonomous driving function for a vehicle is not a dream anymore as it has already been demonstrated on the road by several manufacturers in Asia, Europe, and America. In summary, this type of vehicle is being 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 driver 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 a system 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 Fraunhofer Institute for Secure Information Technology (Fraunhofer SIT) and as a Research Group Manager 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, 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 in December 2007. He also completed his Master of Science (M.Sc.) in Computer Science and Engineering from University of Bremen, Germany. In 2010, he was nominated as a top 10 researcher by academics in Germany. He was awarded from Fricsson, Germany in the year 2008 and from the European Future Internet Architecture Summit (FIA) Research Roadmap Group in October 2011. He worked with the EPSI project (PolSAR), BMBF projects (G-Lab, G-Lab DEEP, FutureBio), 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 and Vehicle to Vehicle (V2V) communication. Previously, he worked on topics such as Future Internet Architectures, 5G, Industry 4.0, Software-Defined Networking (SDN), and Network Function Virtualization (NFV).

KEYNOTE SPEAKER

Md Atiqur Rahman Ahad
Professor, IIUVS
Osaka University, Japan

Vision- and Sensor-based Activity & Gait Analysis

Abstract

Human 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. In this talk, I will present my previous recently on vision-based activity and gait analyses – because of the availability of GPUs and the intense involvement of deep learning (DL) in computer vision applications. However, the problems are complex and diversified and hence, the progress in these domains are still constrained by a number of genuine challenges. In this keynote speech, these issues 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.(Hons.) & Masters (DU), Masters (University of New South Wales), PhD (Kyushu Institute of Technology), JSPS Postdoctoral Fellow and Visiting Researcher (Kyushu Institute of Technology), Assistant Professor (Kyushu Institute of Technology), Lecturer (Nishogakusha Junior Vision and Action Recognition", in Springer; "ICF-sensor based Activity Recognition", in Springer (express). His 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://common.org.UZV3P; General Chair, 9th IDEV http://common.org/IDEV; 4th ISPR http://common.org/ISPR; 2nd ABC http://common.org/ABC; Area Chair, Pattern Recognition Letters, Elsevier; JAIHC, Springer; JHE, Hindawi; UIDC; Member: CGA, ACM, IAPR.

KEYNOTE SPEAKER

Celia Shahnaz
Fellow, IEEE
Professor, BUET

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

Abstract

Tuberculosis detection from chest X-Ray images is an important and yet very greasy 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 X-ray, 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, deep learning (DL) features gain popularity in many computer vision tasks because of their minimum preprocessing requirement and high performance in comparison to the handcrafted features. But its performance is heavily depends on the availability of a large 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 task. The major finding of this work is that a combination of these two types of features in a unified feature vector profile can provide better accuracy than their performance individually. The features from both processing techniques are fused together by using the Canonical Correlation Analysis technique and then classified by Ideal utility Bound Vector Machine to classify the chest x-ray images. The performance of this proposed method is evaluated on a set of chest x-ray images collected by Shenzhen hospital, China. The final accuracy area under the ROC curve (AUC) indicates that it outperforms most of the state of the art methods.

Biography

Celia Shahnaz received Ph.D. degree in electrical and computer engineering from the University of Victoria, Canada, in 2008. She is currently working 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 medal for her contribution in science and engineering in Bangladesh.

Recently, she has been selected as the 2019 IEEE Region 10 Humanitarian Technology Activities Outstanding Volunteer Award. She has been appointed as 2017-18 IEEE R10 Women in Power (WIP) Region 10 Regional Representative/She is the founder and General Chair/technical Program Chair of five cublocated IEEE Technical society/area specific conferences in 2018. Such as ISPE Engineering Medicine and biology (EMBS), IAAL VAS and SSIT, an initiative for the first time in IEEE Bangladesh Section.

KEYNOTE SPEAKER

Dr. Latifur Khan
Professor of Computer Science
University of Texas at Dallas, USA

Big Data Stream Analytics and its Applications

Abstract

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 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 problems using techniques in data streams. In addition, we will present a number of stream classification applications such as adaptive online fingerprinting, textual stream analytics (political actor identification and sentiment stream), attack trace classification using good quality similarity metrics (metric learning) and domain adaptation.

Biography

Dr. Latifur Khan is currently a full Professor (tenured) in the Computer Science department at the University of Texas at Dallas, USA where he has been teaching and conducting research since September 2000. He received his Ph.D. degree in Computer Science from the University of Southern California (USC) in August of 2000. Dr. Khan obtained his B.Sc. degree in Computer Science and Engineering from Bangladesh University of Engineering and Technology (BUET) in 1993. He received his M.S. degree in Computer Science from USC in December 1996. He is a recipient of Developer Award for his work finished at Bangladesh.

Dr. Khan is an ACM Distinguished Scientist and received IEEE Big Data Security Senior Research Award, in May 2019, and Fellow of SIRI (Society of Information Reuse and Integration) award in Aug. 2016. He has published more than 200 papers in data mining, Big Data, and Semantic Web and received Award for Intelligence and Security Informatics and IBM Faculty Award (research) 2014.

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, ICCAI, CIKM, ICDE, ACM SIGIR, ITCS, ECML, IEEE Big Data, ICML, PAKDD, ACM Multimedia, ACM WWW, ICWL, ACM SACMAT, IEEE ICSC, IEEE Cloud and INFOCOM. He has been invited to give keynotes and invited talks in many international conferences such as IEEE ICSC, IEEE Cloud, and ICWL. He has served as program committee member such as SIGKDD 2017, 2016, UCAI 2017, AAAI 2017, SDM 2017, PAKDD 2011 & 2012, DASFAA 2012, ACM WWW 2005, MSD2005, and DASFAA 2007.

Currently, Dr. Khan's research area focuses on big data management and analytics, data mining and its applications, 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), ONR, NSA, IBM and HP.

KEYNOTE SPEAKER

Redoan Hasan Khan, PhD
Senior Member, IEEE
Head of IoT & ICT
Grameenphone Ltd.

Journey from IoT to 5G

Abstract

This talk includes an 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.

Biography

Dr. Redoan 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 core team of Grameenphone to B2B and IoT Venture Group.

Prior to joining Grameenphone's Business division in 2017, Dr. Khan served as the Head of Core Operations 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 journals and conferences, including prestigious IEEE Transactions and Elsevier. He has also received a number of awards for his academic and professional excellence in Bangladesh and abroad, including the Australian Postgraduate Award (APA).

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. (Hons) degree in EEE from BUET.

Faculty of Science & Engineering

Welcome to the Faculty of Science & Engineering, Green University of Bangladesh. It was founded in 2003 and home to the Department of Computer Science and Engineering (CSE), established in 2003; Electrical and Electronic Engineering (EEE), established in 2003 and Textile Engineering (TE), established in 2008.The role of dexterity of this faculty is now lead by Prof. Dr. Md. Abdur Razzaque, an academic leader and devoted researcher for more than 25 years.

Green University of Bangladesh (GUB) believes in imparting quality classroom education for all students, so that 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 which is conducted by Prof. Dr. Md. Abdus Samadani Fakir, honorable Vice-Chancellor of Green University of Bangladesh.

Green University has a library with a rich collection of 11478 number of books, 30000 e-journals, and 34256 thesis. There are also 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 Technical Education (BAETE), Institute of Engineers Bangladesh (IEB) since 2017. The Department of CSE is headed by Professor Dr. Md. Mostofa Kamal Rasel Assistant Professor Sayma Sultana Chowdhury Farhan Ahmed, a veteran researcher and academician in the fields of data mining and machine learning.

Total number of students in both day and evening batches are 1678. Among them the day batch consists of 1087 students having batch consists of 591 students, respectively.

There are 45 faculty members including one distinguished professor, three professors, one associate professor, three assistant professors, and thirty seven lecturers. In addition, nine lecturers & one assistant professor are on study 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 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 academic and industry experts.

A two-day long competitive programming event, titled "UG-Brogrammers – Green University Inter-University Programming Contest (GUPC)", 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

Faculty of Engineering

Total number of students in both day and evening batches are 689. Among them the day batch consists of 353 and the evening batch consists of 336 students, respectively.

At present there are 13 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. Nita Chandra Sutradhar, a legendary academician in the field of textile education in Bangladesh.

The Bachelor of Science in Textile Engineering program is designed to give students the fundamentals of textile. The curriculum is designed to provide students with a broad knowledge of textile production and industrial organizational problems. In addition to theoretical lectures, this program offers extensive laboratory practice, field trip, research project and an industrial internship facility in modern textile mills.

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 syllabus of the regular four-year B.Sc. in Textile Engineering program and the B.Sc. in Textile Engineering program for diploma holders have been reviewed and updated in 2018 based on guidelines of the UGC. The whole degree is of 161 credit hours.

The Department has eight well-equipped laboratories and highly qualified and experienced faculty members having degrees from home and abroad. The Department is also offering regular B.Sc. in Textile Engineering courses of four-year duration and B.Sc. in Textile Engineering courses for Diploma holders.

Textile Engineering Department is in the process of introducing Outcome Based Education (OBE) system. In 2018, an IEB evaluation team visited the department for program evaluation.

The Department has academic collaboration with leading Textile Departments at home and abroad to facilitate student exchange, internship, joint research and credit transfer.

Permanent campus

The permanent campus of Green University of Bangladesh is now under construction at Purbachal American City, Kanchan, Rupganj, Narayanganj. The campus will be established with modern 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 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 151, Department of Electrical & Electronic Engineering consists 159 and Department of Textile Engineering consists 67 students respectively.

At present, there are five laboratories in permanent campus including Multimedia & Graphics Laboratory, Programming Laboratory, Networking Laboratory, Electrical Circuit Laboratory, Physics and Chemistry laboratory.

Samdani Fakir, VC of GUB; eminent scientist and writer Prof. Dr. Muhammed Zafar Iqbal and veteran academician Prof. M. Kaykobad.

In every year, CSE department organizes a gala ICT event titled "CSE Carnival". This festival includes various events like Inter-Departmental Programming Contest (IDPC), Industrial talks, Workshops, Games, career counseling session for CSE graduates, Project showcasing and competition, Gaming contest and Cultural program which helps our students to be more competitive.

The department has academic and industrial collaborations with reputed institutions at home and abroad.

Department of Electrical and Electronic Engineering

The Bachelor of Science in Electrical and Electronic Engineering 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 2019. This department is now lead by Prof. Dr. Md. Fayzur Rahman, an experienced and devoted academician.

Total number of students in both day and evening batches are 1538. Among them the day batch consists of 928 and the evening batch consists of 610 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 pursue their higher studies in USA, Europe, Canada, Australia and so on.

This department has already established 10 laboratories. Each and every semester, the department is upgrading and improving the laboratories by new equipment's and hence the experiments are performed properly. The EEE department has already established Electrical Circuit Laboratory, Analog and Digital Electronics 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 challenging world of the 21st century. Therefore, the syllabus of EEE Department has been designed so that it can cover a broad range of specializations related to the different fields of Electrical Engineering. The whole degree is of 144 credit hours.

EEE department organizes a ceremony titled "EEE Day" every year. During the EEE day program the department organizes job fair, where a number of industries participate. They collect CV's from students.

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, 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.

ST1 - 2019
Committee

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

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

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2. Prof. Dr. Md. Fayzur Rahman, Chairperson, EEE, GUB
3. Prof. Dr. Gourango Farhan Ahmed, Chairperson, CSE, GUB

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2. Prof. Dr. Mohammad Ali Hakim Newton, Professor, CSE, BUET
3. Prof. Dr. Md. Mostofa Kamal Rasel, Sr. Lecturer & Engineering, ULAB
4. Prof. Dr. Md. Monirul Islam, Distinguished Professor, CSE, GUB

Award Committee Chair
Prof. Dr. Md. Quamrul Ahsan, Distinguished Professor, EEE, GUB

Award Committee Members
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2. Prof. Dr. Md. Abdus Sattar Patwari, BUET, BDS
3. Prof. Dr. S A Fattah, Asst. and Nomination Chair, IEEE BDS
4. Prof. Dr. Mashiul Hoque, Dean, Commerce, IEEE BDS

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2. Dr. Md. Shamsul Hossain, Associate Professor, EEE, GUB
3. Dr. Mohammad Aminur Rahaman, Assistant Professor, CSE, GUB

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

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2. Mr. Md. Mahbubur Rahman, Sr. Lecturer, TE, GUB
3. Mr. Md. Ashaduzzaman, Sr. Lecturer, CSE, GUB

ST1 - 2019
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Dr. Anu Rahan Biswas Kanna
Dr. Ahmedul Kabir
Dr. Anupa Chowdhury
Dr. Ameer Ali
Dr. Anakooruman
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Dr. M. Abdul Mazed
Dr. M. Ali Akber Dewan
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Dr. Mahmudul Hasan
Dr. Md. Abdurazzaque
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Dr. Md. Abdullah-Al-Wadud
Dr. Md. Ashraful Hoque
Dr. Md. Atiq Ur Rahman
Dr. Md. Ameer Hossain
Dr. Md. Atiqur Rahman Ahad
Dr. Md. Fayzur Rahman
Dr. Md. Farhad Rabbi
Dr. Md. Golam Rabiul Alam
Dr. Md. Kaykobad
Dr. Md. Mahfuzur Rahman
Dr. Md. Manowarul Islam
Dr. Md. Mashud Alam Manik
Dr. Md. Mokammel Haque
Dr. Md. Mostafizur Rahman
Dr. Md. Mosaddek Khan
Dr. Md. Obaidur Rahman
Dr. Md. Quamrul Ahsan
Dr. Md. Rabiul Hoque
Dr. Md. Zahirul Islam
Dr. Mohammad Abu Yousuf

Organization
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Green University of Bangladesh
Islamic University of Technology
University of Dhaka
Federation University, Australia
Bangladesh University of Business and Technology
Bangladesh University of Engineering and Technology
Islamic University, Kushtia
Jahangirnagar University
Rajshahi University
University of Glasgow, UK
Khulna Dare University
Queensland University of Technology
Khulna University
Patuakhali Science and Technology University
Athabasca University, Canada
European Microkernel Laboratory, Germany
American International University-Bangladesh
East West University, Bangladesh
Islamic University, Kushtia
Daffodil International University
Kwandong University, South Korea
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The University of Aizu
Chittagong University of Engineering and Technology
Chittagong University of Engineering and Technology
Metropolitan University
Dhaka University of Engineering and Technology
Green University of Bangladesh
Islamic University
Green University of Bangladesh
Jahangirnagar University

Event Management Chair
Md. Hasan Maruf, Assistant Professor, EEE, GUB

Event Management Co -Chair:
Md. Hasan Maruf, Assistant Professor, EEE, GUB

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2. Ms. Shrestee Roy, Lecturer, EEE, GUB
3. Mr. Md. Monirul Islam, Lecturer, CSE, GUB
4. Mr. Md. Jahidul Islam, Lecturer, CSE, GUB
5. Mr. Dewan Salman, Lecturer, EEE, GUB

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1. Ms. Umme Habiba Rumman, Lecturer, EEE, GUB
2. Mr. Mahmudur Rahman, Deputy Registrar, GUB
3. Mr. Mohammad Ashif Iqbal, Lecturer, CSE, GUB
4. Mr. Md. Shahnawaz Hossain, Lecturer Lab (C), CSE, GUB

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4. Mr. D.M. Sazibur Rahman, Lecturer, EEE, GUB
5. Mr. Md. Shahnawaz Hossain, PS to Pro-VC, GUB

Accommodation and Local Transportation Committee
Mr. Khan Rahmat Ullah, Assistant Professor, EEE, GUB

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7. Mr. Md. Ahsanuzzaman, Lecturer Lab (C), CSE, GUB

Graphics & IT
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2. Mr. Rushad Bin Sayed, ATO, IT, GUB

TPC Member

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Dr. Mohammad Rakibul Islam
Dr. Mohammad Sanaullah Chowdhury
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Dr. Tushar Kanti Saha
Dr. Uzzal Kumar Acharjee
Dr. Zaheduzzaman Sarker
Dr. Zia Uish Shamszaman

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University of Chittagong, Bangladesh
University of Liberal Arts Bangladesh
Jahangirnagar University
University of Dhaka
Chittagong University of Engineering & Technology
Royal Holloway University of London
University of Dhaka
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Bangkok University, Thailand
Rajshahi University of Engineering & Technology
Sejong University, South Korea
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Military Institute of Science & Technology
The University of Texas at Dallas, USA
Jahya Kahi Kazi Nazrul Islam University
Jagannath University, Bangladesh
Ericsson, Sweden
University College Cork, Ireland

STI - 2019
Program Schedule

Time	Event
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
11:00 AM – 11:15 AM	Tea Break
11:15 AM – 11:45 AM	Keynote – 02
11:45 AM – 01:00 PM	Parallel Technical Sessions
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
03:00 PM – 04:00 PM	IEEE BDS Activities
03:00 PM – 04:15 PM	Parallel Technical Sessions
04:15 PM – 04:30 PM	High Tea Break
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

STI - 2019
Program Schedule for Keynote Sessions

DAY - 1

D1-K1
Tuesday, 24 Dec 2019
10:15 AM – 11:00 AM
Room# Seminar Hall (302)

Keynote 01: From Smart Sensing to Smart Living

Sajal K. Das, IEEE Fellow
Professor and Daniel St. Clair Endowed Chair,
Department of Computer Science
Missouri University of Science and Technology, USA
Session Chair: Prof. Dr. M. Kaykobad (BUET)

D1-K2
Tuesday, 24 Dec 2019
11:15 AM – 11:45 AM
Room# Seminar Hall (302)

Keynote 02: Power electronics applications in renewable energy

Muhammad H. Rashid
Professor
Florida Polytechnic University, USA
Session Chair: Prof. Ir. M. Jahirul Haque (ULAB)

D1-K3
Tuesday, 24 Dec 2019
02:00 PM – 02:30 PM
Room# Seminar Hall (302)

Keynote 03: AI, Big Data & Cyber Security to Empower & Enable Industry 4.0

Alamgir Hossain
Professor of Artificial Intelligence
Teesside University, UK
Session Chair: Prof. Dr. Chowdhury Mofizur Rahman (UIU)

D1-K4
Tuesday, 24 Dec 2019
02:30 PM – 03:00 PM
Room# Seminar Hall (302)

Keynote 04: Transformative Computing towards a Sustainable Connected World

Fahim Kawsar
Director, Pervasive Systems Research, Nokia Bell Labs, Cambridge, UK
Proressor of IoT, Design Engineering, TU Delft, Netherlands
Session Chair: Prof. Dr. Md. Abdul Mottalib (ULAB)

D1-K5
Tuesday, 24 Dec 2019
04:30 PM – 05:00 PM
Room# Seminar Hall (302)

Keynote 05: Fusion of Hand-Engineered and Deep Learning Features for Tuberculosis Detection from Chest X-Ray Images

Celia Shahnaz
Chair, IEEE BDS
Professor, BUET
Session Chair: Prof. Dr. Md. Quamrul Ahsan (GUB)

STI 4.0 - 2019
Program Schedule for Keynote Sessions

DAY - 2

D2-K6
Wednesday, 25 Dec 2019
10:30 AM – 11:00 AM
Room# Seminar Hall (302)

Keynote 06: Image Processing Software Development: Issues, Solutions, Applications

Oksam Chae
Professor of Computer Vision
Kyung Hee University, South Korea
Session Chair: Prof. Dr. Md. Haider Ali (DU)

D2-K7
Wednesday, 25 Dec 2019
11:00 AM – 11:30 AM
Room# Seminar Hall (302)

Keynote 07: Who is Driving Your Car?

Rahamatullah Khondoker
Professor of Applied Sciences
Darmstadt University, Germany
Session Chair: Prof. Dr. Hafiz Md. Hasan Babu, (NU)

D2-K8
Wednesday, 25 Dec 2019
02:00 PM – 02:30 PM
Room# Seminar Hall (302)

Keynote 08: The Warp Knitting Technology on the Seamless Process Design Method

Deng Zhongmin
Professor and Executive Vice-Director
Hubei Modern Textile Engineering Research Center, China
Session Chair: Prof. Dr. Nitai Chandra Sutradhar (GUB)

D2-K9
Wednesday, 25 Dec 2019
02:30 PM – 03:00 PM
Room# Seminar Hall (302)

Keynote 09: Cyber Security in 4th International Revolution

Dr. Tasmina Islam
Kings College , London
Session Chair: Prof. Dr. Md. Zahidul Islam

D2-K10
Wednesday, 25 Dec 2019
03:00 PM – 03:30 PM
Room# Seminar Hall (302)

Keynote 10: Vision- and Sensor-based Activity & Gait Analysis

M. Aliqur Rahaman Ahad
SMIEEE , Osaka University , JAPAN
Session Chair: Prof. Dr. Md. Mushfiqul Haque (CUET)

D2-K11
Wednesday, 25 Dec 2019
03:45 PM – 04:05 PM
Room# Seminar Hall (302)

Keynote 11: Big Data Stream Analytics and Its Applications

Latifur Khan
Professor of Department of Computer Science
University of Texas at Dallas, USA
Session Chair: Prof. Dr. Md. Ashfanuzzaman (IU)

D2-K12
Wednesday, 25 Dec 2019
04:05 PM – 04:25 PM
Room# Seminar Hall (302)

Keynote 12: Journey from IoT to 5G

Dr. Redoan Hasan Khan
Head of IoT, Grameenphone
Session Chair: Prof. Dr. Md. Mamun-or-Rashid (DU)

STI - 2019
Program Schedule for Technical Sessions

DAY – 1: Technical Session 1

D1T1P1
Tuesday, 24 Dec 2019
11:45 AM – 01:00 PM
Room# Seminar Hall (302)

Parallel Session 1: **Computer Vision, Image Processing and Pattern Recognition**
Session Chairs:
1. Prof. Dr. Shorif Uddin (JU)
2. Dr. Shahriar Sazzad (MIST)

Sl. No.	Paper ID	Paper Title
1.	PID-116	Digit Recognition in Sign Language Based on Convolutional Neural Network and Support Vector 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

D1T1P2
Tuesday, 24 Dec 2019
11:45 AM – 01:00 PM
Room# 306

Parallel Session 2: **Internet of Things (IoT), Cloud and Big Data Analysis**
Session Chairs:
1. Prof. Dr. A. B. M. Alim Al Islam (BUET)
2. Prof. Dr. A.K.M. Muzahidul Islam (UIU)

Sl. 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 Management System Using WSN via IoT
8.	PID-178	Cloud Based Remote Healthcare Monitoring System Using IoT

D1T1P3
Tuesday, 24 Dec 2019
11:45 AM – 01:00 PM
Room# 305

Parallel Session 3: **Devices, Circuits and Systems**
Session Chairs:
1. Prof. Dr. Kazi Khairul Islam (Chittara Univ.)
2. Dr. Rasad Khan (NU)

Sl. 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 Cement Mortar Mixed Glass Fiber up to Six and Six Anyong

D1T1P4
Tuesday, 24 Dec 2019
11:45 AM – 01:00 PM
Room# 307

Parallel Session 4: **Photovoltaics and Renewable Energy**
Session Chairs:
1. Prof. Dr. Abdur Razzak (BUP)
2. Prof. Dr. Fahmid Rabani (BUT)

Sl.	Paper ID	Paper Title
13.	PID-66	Operation Planning of Renewable Energy Based Hybrid System incorporating Waste-to-Energy (WtE) Technologies
14.	PID-97	A New Medium Voltage Modular Multilevel Inverter with Advanced Carrier-based Pulse Width Modulation for Solar Photovoltaic Systems
15.	PID-41	Solar Based Automatic Irrigation System with GSM Module
16.	PID-73	Performance Investigation of Different PV Array Configurations at Partial Shading Condition for Maximum Power Output

Day-2, Technical 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 (IIU)
2. Prof. Dr. Md Abdul Masud (PSTU)

Sl.	Paper ID	Paper Title
40.	PID-1	Extrapolation, Design and Implementation of a Bangla Web Document Amendable Text Synopsis
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 Network
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

D2T3P2
Wednesday, 25 Dec 2019
09:00 AM – 10:15 AM
Room# 307

Parallel Session 2: **Photonics, Fiber Optics & Optical Resonator**
Session Chairs:
1. Prof. Dr. Md. Monjurul Alam (IU)
2. Dr. Ashraful Alam (BRAC Univ.)

Sl.	Paper ID	Paper Title
45.	PID-42	A comparative study of a PCMPC Battery, Super-capacitor based energy source owing to hybrid vehicles
46.	PID-101	Mile-to-Modulator Vibration Sensitive Cost-Effective Electrolyte Generating Nozor 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

D2T3P3
Wednesday, 25 Dec 2019
09:00 AM – 10:15 AM
Room# 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)

Sl.	Paper ID	Paper Title
50.	PID-99	Development of an Assistive Device for Elderly Bedbound People to Share Needs with Caregiver and Controlling Home Appliances
51.	PID-135	A GAV-Based Traffic Monitoring System for Smart Cities
52.	PID-167	LIFEDRAFT: An Android Based Application System for Woman Safety
53.	PID-191	Android Apps Success Prediction Before Uploading on Google Play Store
54.	PID-198	Minimizing Execution Cost of User Application Codes in Mobile Device Cloud

D2T3P4
Wednesday, 25 Dec 2019
09:00 AM – 10:15 AM
Room# 305

Parallel Session 4: **Robotics, Control, & Automation**
Session Chairs:
1. Prof. Dr. Md. Fayzur Rahman (GUB)
2. Dr. Shamim Kaiser (JU)

Sl.	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 Power 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

Day-2, Technical Session 4

D2T4P1
Wednesday, 25 Dec 2019
11:30 AM – 12:45 PM
Room# 307

Parallel Session 1: **Computer Vision, Image Processing and Pattern Recognition**
Session Chairs:
1. Prof. Dr. Mohammad Abu Yousuf (JU)
2. Prof. Dr. Md. Hasanul Kabir (IUT)

Sl.	Paper ID	Paper Title
60.	PID-49	Degraded Document Enhancement through Binarization Techniques
61.	PID-90	Infrared 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

D2T4P2
Wednesday, 25 Dec 2019
11:30 AM – 12:45 PM
Room# 307

Parallel Session 2: **Wireless Networking and Security**
Session Chairs:
1. Prof. Dr. Md. Obaidur Rahman (DUET)
2. Dr. Md. Abu Layek (JU)

Sl.	Paper ID	Paper Title
65.	PID-18	Information Extraction from WWW using a Structural Approach
66.	PID-84	An Unorthodox Way of Forming Without Intermediaries Through Blockchain
67.	PID-102	A Robust Database Watermarking using Local Differential Privacy
68.	PID-108	Cognitive Internet of Vehicles: Motivation, Layered Architecture and Security Issues
69.	PID-117	A Proposed Secure Mobile Money Transfer System for SME in Bangladesh: An Industry 4.0 Perspective

D2T4P3
Wednesday, 25 Dec 2019
11:30 AM – 12:45 PM
Room# 305

Parallel Session 3: **IoT, Cloud Computing and Machine Learning**
Session Chairs:
1. Prof. Dr. Muhammad Mahbub Alam (IUT)
2. Prof. Dr. Chowdhury Farhan Ahmed (GUB)

Sl.	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-119	A two-stage algorithm for engagement detection in online learning

D2T2P4
Wednesday, 25 Dec 2019
11:30 AM – 12:45 PM
Room# Seminar Hall (302)

Parallel Session 4: **Textile Engineering**
Session Chairs:
1. Prof. Dr. Nitai Chandra Sutradhar (GUB)
2. Prof. Dr. Ismail Chowdhury (GUB)

Sl.	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

Interactive Poster Session

D2IPS
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. Moinul Islam (GUB)
3. Dr. Md. Anwar Hossain (GUB)
4. Dr. Jagannath Biswas (GUB)

Sl.	Paper ID	Paper Title
1.	PID-16	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-139	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

ABSTRACTS

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

Venue: Seminar Hall (302), Session Chairs: Prof. Dr. Shorif Uddin (JU), Dr. Shahriar Sazzad (MIST)

PID: 116 **Digit Recognition in Sign Language Based on Convolutional Neural Network and Support Vector Machine**
Md. Shahin Alom, Md. Jahid Hasan, Md. Ferdous Wahid

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 for 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 can-ning to and to communicate between signers and non-signers.

PID: 127 **Plant Leaf Disease Detection using Mean Value of Pixels and Canny Edge Detector**
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 can be done by combining convolutional neural network. 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 obtaining shape features.

PID: 150 **Improvement in Hyperspectral Image Classificationby Using Hybrid Subspace Detection Technique**
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 possibleSolution 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% classificationaccuracy for AVIRIS dataset and 99.2074% classification accuracyfor HYDICE dataset.

PID: 173 **Precision Agriculture: Renewable Energy Based Smart Crop Field Monitoring and Management System for Remote Sites**

Mohammad Samsoul Islam, Gobap Kanti Dey

Abstract—Although agriculture is the 21st century, it is exceedingly reliable on industrialization, agriculture works as an unavoidable driving force for economic growth of the country like Bangladesh. Conventional agriculture has many challenges, comparatively complex and unsecure, consequently has rendered new opportunities to promote our existing agricultural system. This paper work depicts about the design and implementation of a smart crop field monitoring system which is based on internet of no 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 soil moisture, soil moisture, water level, temperature, humidity as well as the general condition of the crop field for the farmers in a user friendly, easily accessible manner with real time data, and notification via E- mail, SMS. We can monitor the crop field with the help of camera and will be able to take the necessary steps remotely on the basis of present conditions. We have developed a prototype model and tested experimental data to show system accurate and result-oriented part of Bangladesh.

PID: 178 **Cloud Based Remote Healthcare Monitoring System Using IoT**

Md. Ashraful Alam, Md. Shahriar Rahman

Abstract—None-to-date new technology in various areas housed to improve the quality of human life. People are micro-living in their busy schedule and people losing their life inconsiderately due to lack of proper care. It is implement actual based remote health-care monitoring system using IoT.The proposed architecture collects the patient's health data, transmits to remote nodes and forwards it to the cloud. In the cloud, the data will be further processed and analyzed. Thedata can be viewed remotely at any time anywhere by a smartphone or a computer connected to the Internet. Moreover, the system will send an alert to the caregiver using Arduino which are provided as health-related data collection. The system is finally implemented.

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

Venue: Room-306, Session Chairs: Prof. Dr. Md. Kazi Khairul Islam (Ghora Unn.), Dr. Rawad Rava Mahmud (AUST)

PID: 38 **Structural and magnetic properties of zinc substituted cobalt nanoferrite sintered at various temperatures**

S. Nasrin, M. Moazzam Hossen, F. Ahmed, S. Chowdhury, S. Mariyya Hoque

Abstract—$Zn_xCo_{1-x}Fe_2O_4$ (x=0.2, 0.4, 0.6 and 0.8) were prepared using typical wet chemical co-precipitation technique. The ferrite specimens have been sintered at 700°C and 800°C for three h in air. X-ray diffraction (XRD) confirmed the formation of single-phase cubic spinel structure. The lattice constant, 'a' of the synthesized cubic spinel structure was established from XRD studies. Employing vibrating sample magnetometer (VSM), saturation magnetization, remanent magnetization, etc. have been determined. The value of coercivity increased with Zn content. All the samples were soft ferrites. Increasing zinc content, the value of saturation magnetization consequently decreasing. Ferromagnetic to superparamagnetic transition was found with increasing zinc concentration. Néel's two sublattice model of ferrimagnetism in spinel ferrites was applied to the substituted cobalt which has been proved by the substitution of a cationic dopant and two magnetically split sextets. Complex permeability has been determined employing an impedance analyzer. The real permeability and initial permeability along with loss tangent were studied as a function of the frequency range 1kHz to 120 MHz. It shows constant value at the high-frequency range that is identified appropriate for the ferrite samples to apply for the materials for storage device applications.

PID: 111 **First Principle Study of Pristine and Zn Doped B6 Nanocluster**

Madhu Nishal, Md. Rakib Hossain, Moni, Farzana Ismil, Md. Kamal Hossain, Farid Ahmed, Mohammad Tahmina Rezwan

Abstract—2D nanomaterial becomes one of the most dynamic areas of nanomaterial researches due to their unique physical and chemical properties. Recently, researchers have been interested in the study of 2D transition metal boride sheets because of their unique electronic and magnetic properties. Among these 2D materials, B6 has theoretically investigated the geometry, stability, electronic and optical properties of the Zn doped B6 nanocluster (Zn@B6) using density functional theory (DFT). The most stable configurations of Zn and B6 nanoclusters is explored with the analysis of Mulliken charge transfer, adsorption energy and thermodynamic stability. Moreover, the Zn doped B6 nanocluster is also investigated for the study of HOMO-LUMO energy, photoelectron spectra, density of states (DOS), and optical properties. The Zn doped B6 nanocluster becomes moment, global indexes and HOMO-LUMO energy gap (Eg) analysis. For pristine B6 the value of HOMO-LUMO gap is 1.60 eV but for Zn@B6 it is 2.71 eV which is 1.7 times higher than pristine B6 nanocluster. The value of Eg decreases drastically after doping Zn atom by-gravimetrically in B6 which is also pictured by density of state (DOS) spectra. Besides, the optical properties of pristine and Zn doped B6 nanocluster are also studied. The latter enhanced their optical absorption and conductivity. Our theoretical investigations indicate that B6 cluster turns into optically active material for doping Zn atom.

PID: 162 **Performance analysis of CdTe solar cells: A Numerical Analysis**

K. A. A. Mamun, Abdullah Al Mamun Mionn, Sonkor Kanti Nath, S Mouri, M. M. Rahman

Abstract—CdTe solar cell is considered as the most suitable material for solar cell due to its low cost, large absorption coefficient, and higher efficiency. The efficiency and performance of CdTe solar cell can be further improved by using ZnO as front contact. Zinc oxide has a high transmittance and wide optical bandgap which makes it an optimum choice front contact for any solar cell. ZnO is one of the best options for nanostructured solar cells because of its high electron mobility. In this work, a CdTe/ZnO solar cell has been analyzed using the numerical simulation software AMPS-1D (Analysis of Microelectronic and Photonic Structures) to determine it's maximum efficiency. Different parameter of ZnO (100nm) thin film is simulated such as bandgap, electron affinity, dielectric constant, effective density of states and mobility of both type. The maximum efficiency of ZnO thin film is found 22.836%. The study highlights the changing of different parameter of ZnO thin film and its impact on efficiency.

PID: 182 **Thermal Conductivity of Silicene nanoribbon due to Ge and Sn doping**

Md. Hasan Furhad, Mohammad Tahmina Rezwan

Abstract—Recently the two-dimensional honeycomb structured silicon namely silicene has captured a deep interest of researchers due to its excellent electronic and manipulate thermalvaporization properties. The lower value of thermal conduc-tivity of silicene has made it a suitable material in case of thermoelectric applications. The thermal conductivity of silicene can be further reduced by introducing an silicene nanoribbondoping. zigzag direction has been investigated in this study. Twodifferent atoms- Ge and Sn from the same group of silicenehave been added as impurity atoms with various doping concentrations. Our experimental data have revealed doping dependencies' thermal conductivity on both doping amount and dopingelements. The thermal conductivity of 0.89% Ge doped zigzagsilicene nanoribbon is found 14.08 W/mK at 300K which is 80% lower than undoped silicene. Sn is found as the competent isgeneminum the value of the same parameter has been found near around 6.2 W/mK for same doping concentration at roomtemperature. Also among different doping patterns, edge dopingshas shown lowest value of thermal conductivity for all dopingconcentrations.As the thermal conductivity is reducing rate at the edgesof the lattice. Further investigation have revealed the strongwidth dependence of the thermal conductivity of silicene nanoribbon. It has been found that the value of it is also reduced with the width of the nanoribbon. All these results suggest that silicene nanoribbonsdoped with both germanium and tin atoms have comparativethermal conductivity than the pristine structure and can bea potential thermoelectric material of the next generation.

PID: 73 **Performance Investigation of Different PV Array Configurations at Partial Shading Conditions using Modified Particle Swarm Optimization Method**

Md. Rakibul Hasan, Md. Mahbubur Rahman, Md. Ashraful Alam

Abstract—Partial shading condition, multiple peaks in power-voltage (P-V) curves of photovoltaic (PV) arrays, and short circuit current and open circuit voltage (ISMU) in each PV module significantly affect the PV array output. Increasing the shading size. The shading effects can be minimized by changing the array. This paper investigates the performance of different PV array configurations at partial shading conditions and chooses for six different sizes of shading patterns. The experimental investigation is carried out using a 4×4 PV array with series-parallel (SP), series-cross-tied (SCT), bridge-linked (BL), and honey-comb (HC) configurations. The results of six different shading patterns show that SCT configuration gives higher output power than other configurations. Moreover, a modified particle swarm optimization (MPSO) method is proposed to track the global maximum power (GMP), reduction and improvement percentage of microwatable energy (PWE). The SCT configuration yields a maximum %RE of 30.48% for a 4×4 PV array.

Day- 01: 24 December 2019, Time: 11:45am, Technical Session- 01, Parallel Session- 05

Venue: Room-404, Session Chairs: Prof. Dr. Lutfa Jamil (ISU), Dr. Mohammad Ali Hossain (GUB)

PID: 87 **Design of an Inductance Featured and Speed Controlled Obstacle Avoiding Robot**

Ertaza Tawaf Efaz, Abdullah Al Mamun, Khan Salman, Fahmid Kabir, Syed Nazmus Sakib, Irfan Khan

Abstract—The paper represents the design of an Obstacle Avoiding Robot with inductance. The robot detects objects in its path and navigates around those objects by itself. The robot is controlled by a microcontroller a robotic unit based on Arduino UNO and Adafruit Motor Shield where the code is written in Arduino IDE software and uploaded to the board. Ultrasonic sensor HC-SR04 is used to measure the distance. The robot is also equipped with an inductance sensor placed on the Micro-Servo Motor enabled more precision for detecting the surrounding objects. This designed robot is different than other available robots because of the integration of the Micro-Servo Motor and a DC RGB Emitter. The robot is also achieved the ability to indicate object detecting procedure and control the speed of DC Gear Motors in 4 types of speed using a potentiometer. Moreover, the robot is designed in such a way that it can be used in many areas not creating any noise and vibration. Furthermore, the designed robot is expected to be deployed for military operations and humanitarian assistance by improving the capacity of object detection in diverse environments.

PID: 114 **Optimal Worker Selection for Maximizing Quality-of-Service of Online Food Delivery System**

Farhana Hug, Nahar Sultana, Sujan Sarker, 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 or by not considering the profit demands of workers. In this paper, we fill this gap and develop an optimization framework to make a trade-off in between the profit of workers and task completion 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.

PID: 143 **A Smart Assistive Computer Numerical Control System for Visually Impaired People to Operate Machine**

Tasnim Ferdous Ahmed, Abdullah Al Mamun Bin Ahsan, Sazia Tasnim, Jannatul Ferdous Deepa

Abstract—It is known that Braille Systems are used for assisting visually impaired person to read and write.But most of the visually impaired people cannot use Braille System because of its complexity. In most cases, they are pretty much high in price as well. Most importantly, it becomes difficult for the visually impaired people to communicate and understand each other. The purpose of this study is to make their day to day activities blind people often rely on pen and paper to relay short messages using words that they can feel with their fingers. Unfortunately, this method is not very efficient. This project undertakes a thing different and innovative assistance in the learning process. Blind people find it difficult for less privileged people who do not get the adequate support or assistance to learn writing skills and to express their ideas. This project is an attempt to help them in this regard. The project uses Servo Motors and an organ dictated by switching devices and offers greater flexibility in the learning process. The system takes a long time as a 3000 pressed footpad for input and a headphone, and vibration motor for output. The system also has a 3000 pressed footpad that is easier to operate the device and makes it easier to learn the patterns of different kinds of shapes of alphabets or geometrical figures without any assistance. Moreover, the device is also equipped with a vibration motor that helps the visually impaired to turn on sensors and turn off the device. The proposed system is also cost-effective, user-friendly, portable, time and determine the result on its own. Our proposed model is a microcontroller based device that can generate different kinds of shapes and also operate on its own which is the actual purpose of this study. Therefore, this assistive device will help visually impaired people in a great extent by teaching them the patterns and operation of different machines.

PID: 179 **Smart Car Parking with the assistance of Line Following Robot**

Mohammad Abdur Rahim, Mahbubur Rahman, S M Faiaz Rashid Nishat, Nashita Binte Asad

Abstract—This paper proposes a smart indoor car parking system that can be time and cost effective. The system is built with a line following robot and a car parking area. The car parking area has the following robots: Guiding Robot to guide the arrival and the parking slot to the arriving cars. This paper discussed a realtime implementation of a conventional line following robot, using it for the indoor car parking system. Moreover, some additional features like RFID tag reader have been added to the line. Our proposed system will have its implementation cost really low due to the ease of availability of the line following robots. Besides, the proposed system will be very much time efficient as it will be an indoor car parking system. Moreover, the proposed smart car parking system can only be realized during the construction of new buildings. However, existing traditional parking systems are huge in numbers and they are not going to be replaced in the near future. Hence, this paper also proposes a solution for the renovation is impossible in some cases. Therefore, our newly fashioned idea includes developing a proposed solution to those existing problems in the available indoor car parking systems giving an efficient alternative for the users.

Day- 01: 24 December 2019, Time: 02:30pm, Technical Session- 02, Parallel Session- 02

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

PID: 13 **Data Transmission via Wireless Channel to Store in a Remote Device Employing Error Detection and Correction Code**

Mohammad Abdul Kader, Mohammad Mamun Uddin, Md. Arifur Rahman, Naeemul Islam, Mohammad Abdur Razak

Abstract—Data transmission from wireless sensor array or sensor network is essential for diverse applications such as weather monitoring, agriculture data monitoring etc. During wireless data communication, the communication channel is affected by noise and other factors which may cause corruption of data bits while receiving or information disruption at the receiver end. 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

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 through wireless channel. The receiver unit detects and corrects the error bits if any and then stores them in an SD card for further analysis. The system is tested for collecting data from a sensor array consisting of three sensors. The result shows that the system is capable of detecting and correcting an error to ensure error-free communication through a wireless channel.

PID: 61 **An Energy-Efficient Scheduling of Heterogeneous Network Cells in 5G**

Md. Shamim Hossain, Nahar Sultana, Sujan Sarker, Md. Abdur Razzaque

Abstract—In fifth-generation (5G) wireless communication sys-tem, small cell networks (SCNs) on the key technologies to meet the demands of future mobile traffic in the mobile internet. However,meeting exponentially increasing data rate of the users demandsdeploying large number of SCNs which is energy-hungry.If theyare kept active always. Therefore, energy saving approaches areessential. In this paper, we are considering a mesh hierarcal data-driven two states system model. In this paper, we assume fountains for network energy saving. We propose a scheduling algorithm for SCNs that can be in sleep mode or active mode. We consider a heterogeneous network where small cells are the base stations of a given time. Our analysis depictsthat proposed system offers significant performance improvementcompared to the state-of-the-art work.

PID: 113 **Prioritized IEEE 802.15.6 MAC Protocol for Wireless Body Area Network**

Nahar Sultana, Farhana Hug, Md. Abdur Razzaque, Md. Mustafizur Rahman

Abstract—Collecting data from heterogeneous on-body and implanted sensor devices of Wireless Body Area Network (WBAN) is a challenging task due to interference and strict delay and reliability requirements. While prioritized data collection is addressed in the literature for inter-WBANs, however how to prioritize transmissions from different WBANs under coordinator mode is yet to be explored. In this paper, we develop collaborative medium access mechanisms (CMAC) for critical and noncritical data traffic co-located with different data. We develop two mechanisms for accommodating critical data traffic in sleep mode and schedule their transmissions based on their priorities. The result of performance analysis depicts that the proposed CMAC mechanisms offer significantly reduced delivery delay for critical traffic while maintaining low power consumption.

PID: 188 **Distributed Multi-radio Multi-channel Communication using Directional MAC for IoT-based Wireless Networks**

Arpita Howlader, Kazi Mohsi Ahmed, Md. Obaidur Rahman

Abstract—In the era of fourth industrial revolution (i.e., industry 4.0), IoT based smart networking using sustainable technologies for smart cities and smart homes. To contribute in such industrial development, in this paper, a Distributed multiradio multi-channel directional (DMD) MAC protocol is introduced for IoT based wireless networks. The proposed protocol employs directional antennas to mitigate the directional hidness and spatial reuse with higher data rates. However, such protocol experiences directional hidden terminal problem, deafness and head-of-line blocking problem irrespective of number of channels (i.e., single and multi-channels). As of now, lots of techniques such as synchronization, busy-tone, cooperative 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 MAC CCC creates throughput drastically reduced. In this paper, we have designed DMDS-MAC protocol as an asynchronous directional dual antenna protocol to overcome the above mentioned problems. Here, we have used two antennas for each node, one for sending and the other for 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.

Day- 01: 24 December 2019, Time: 03:00pm, Technical Session- 02, Parallel Session- 03

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

PID: 192 **Hybrid Clustering of Renewable Energy Based Hybrid System Incorporating Waste-to-Energy (WtE) Technologies**

Md. Abdul Masud, Md. Mosaddek Khan, Md Sajjad Hossain

Abstract—The Selection of Renewable energy to produce electricity is increasing rapidly in Bangladesh because of its geographical location and environmental condition. Due to the intermittent behavior, finding the generation of electricity in our country is still incapable to meet its demand. Therefore, this paper presents a hybrid renewable energy system (HRES) which is the combination of Solar Photovoltaic (PV) and Waste-to-Energy (WtE) technologies to Chittagong, Bangladesh. The primary goal of this research is to find the most feasible and cost-effective HRES which can fulfill the load demand of the selected area to gain 100 % electricity and carbon content free. The simulation of the HRES is carried out by HOMER to show the supply of electricity to specific residential load and the target to reduce the cost of energy consumption. Moreover, the study also focuses on the sensitivity analysis of the HRES to find the most optimized configuration. Finally, the study has also proposed cost analysis for the hybrid system. After all, Producing Electricity from the biomass with Renewable Energies and make the reliable use of energy and definitely help us to achieve the goal of sustainable development.

PID: 97 **A New Medium Voltage Modular Multilevel Inverter with Advanced Carrier-Based Pulse Width Modulation Technique for Photovoltaic Systems**

Md. Tariqul Islam, Md. Rabiul Islam, Md. Shoran Mahmud, Md. Faysur Rahman, Md. Ashik Rahman

Abstract—In recent years, the multilevel inverter is the most popular topology for photovoltaic (PV) which have drawn considerable attention from the industry and the academia alike due to their diverse benefits. This paper presents a modification of a number of voltage source switching devices and the driving control functionalities compared to the traditional MLI topologies. In this paper, a new symmetric multilevel inverter topology is proposed with a reduced number of switches, gate drivers, and DC sources for comparison. Furthermore, the total harmonic distortion (THD) of the proposed multilevel inverter topology is less in comparison to that of the existing MLI topologies, which is the main objective of this research. The proposed topology uses only 12 switches (IGBT/MOSFET) to carry out the necessary steps and comparisons to the existing ones in terms of the number of switching devices and power diodes, voltage stress, and THD. Besides, the THD of the proposed topology is 3.98% which is lower than the existing topologies having uses only 67% switching devices and diodes. Another thing is that, this topology is able to generate 13 level output voltage with low total harmonic distortion than existing topologies. Due to the reduced number of switches and power diodes count, the proposed topology will be cost-effective as well as increased efficiency with the reduced overall system cost. The proposed MLI topology has a great potential for the industrial applications and the realization of a sustainable solar PV system.

PID: 41 **Solar Based Automatic Irrigation System with GSM Module**

Md. Ashraful Alam, Md. Rakibul Hasan, Md. Alamgir Hossain, Md. Kamal Uddin, Arif Mahmudunnabi, Md. Mahbubur Rahman

Abstract—In this investigation, the traditional irrigation system of Bangladesh has been modernized using modern technologies. The main motivation behind this research is to overcome the problems mentioned in the above discussed. More precisely, user-friendly watering in the field, along with reducing labor cost, standardization of farming system, using technologies to reduce the need for peak demand for fuel, and improving the quality of crops are the key objectives. ATmega 2560 microcontroller, Sensors, GSM module, LCD, and Solenoid valve has been used to implement the proposed system. Besides, a prototype model of the system has been built and has been measured. That information has been used to be sent through a short message service. Finally, the system 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 used for the system.

PID: 190 **Enhancing Quality of Service in SDN based on Multi-path Routing Optimization with DFS**

Md. Saiful Hossain, Md. Habibur Rahman, Md. Ali + Mustanjid, Md. Arif Shakil Hosen, Md. Mahbubur Rahman

Abstract—Remarkable growth of network traffic has terminated resistantly due to the use of online applications, video streaming, and cloud computing. Software Defined Networking (SDN) is a new approach to optimize the QoS in the network. Nevertheless, Software Defined Networking (SD-N)has been developed to meet this challenge. SDN allows theprogrammable features of network and responds dynamically to the changing network routing problem in SDN is addressedand resolved under OpenFlow protocol where Key controllersare used to implement SDN using the Minimal WiFi emulator Besides, a dynamic path is proposed using a module known as Application Specific Integrated programming along with OpenNetwork Key controller. In the simulation results, depth first search(DFS) algorithm is implemented to find the shortest path. The results show that DFS can reduce the latency and quality of service (QoS) in SDN.

Day- 01: 24 December 2019, Time: 03:00pm, Technical Session- 02, Parallel Session- 02

Venue: Seminar Hall (SD), Session Chairs: Prof. Md. Mijanur Rahman (JKKNIU), Prof. Dr. Shamim Al Mamun (JU)

PID: 45 **Design and Implementation of Industrial Utility Controller with Smart Communication by Power Line Communication Technology**

Md. Rakibul Hasan Pavel, Mahmudul Hasan, Md. Sabbir Ahmed, Arif Kaiser

Abstract—This paper has designed to provide monitoring and alarming system in some fixed place using a Wire-no-machine communication technology system through which we can monitor and control as well as control a lot of industrial heavy electrical appliance located in a clogged place. A DC power supply unit, a microcontroller unit, a PLC modem unit, a relay unit, a mobile technology unit and a computer software programming along with OpenNetwork Key controller. In the simulation results, depth first search(DFS) algorithm is implemented to find the shortest path. The results show that DFS can reduce the latency and quality of service (QoS) in SDN.

PID: 67 **Characterization of Nanowire Field Effect Transistor and Comparison Based on Different Performance Criteria**

Sabrina Hossain Moni, Naima Nasrin Mokta, Jibesh Kanti Saha

Abstract—This work presents a characteristic study of Cylindrical Surrounding Gate Nanowire Field Effect Transistor (NWFET) using Technology Computer Aided Design (TCAD) simulation tool. The device is a Gate-to-Source/drain regime using the Shift-Multiplication method and quantum regime using the Self-Consistent Non-Equilibrium Green's Function approach. The necessary process flow for modelling the proposed device emphasizing the improved n-levels of different single materials has been described in this paper. Simulation 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).

PID: 153 **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 coal. But, these fossil fuels are highly responsible for greenhouse gas emissions (GEG). Carbon Capture Process (CCP) technologies are expected to play an effective role in the upcoming decades to reduce greenhouse gas emissions. Integrated Gasification Combined Cycle (IGCC) power plant is one of the energy generation technologies having the significant potential to capture carbon dioxide (CO_2) with low penalties. The main contribution of this research is to find a suitable technology to reduce the massive emission of CO_2 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. The comparison between Integrated Pulverized Coal-Fired power plant based on their performances in terms of capital cost, operating cost, CO emission factor, and net efficiency. In terms of CO_2 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_2 .

PID: 55 **Designing and Simulation of Enhanced Power Generation Device by Employing Foot-bridge System**

Sajib Hossain Tez, 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 electricity is now experiencing a large gap between the supply and demand. It is emerging as a significant provocation. To surmount this problem, we require to execute the methods of power generation from renewable sources. This paper is based on the generation of power from the movement of electricity through modified pressure plate. The modified pressure plate is designed by using rack and pinion and archetype model is built and further scrutinized. The initial maneuvering is consuming the pressure produced by physicians and users in the form of energy conversion. Each of the mechanical modifications and improvements three spur gears along with one rack and pinion model. The spur gears are affiliated with shafts and flywheel is associated at the edge of it. Each of the mechanical modifications and improvements is based on generation. J-charge sinning capacitors, 4 voltage sensors, 1 buck-converter, 2 BJTs which are used as switches, 8 diodes and charge and discharge 12 V, 7AH lead-acid batteries.

PID: 70 **Modified But Algorithm with Hybridization ofGaussian Probability and Doppler Effect**

Tahsin Anic, Md. Rashedul Kabir Chowdhury, Tasfeed Muhammad, Nafees Salik

Abstract—The bat algorithm is a new metaheuristic swarm intelligence algorithm for solving optimization problems. A similar species,while it is being remarked every now and then very specialistalthough behavior in nature is not fully understood. This paper proposes a modified bat algorithm with hybridization of Gaussian probability and Doppler Effect to improve the performance of the algorithm. The results of the proposed algorithm are summered by micro-dots are used for exploration & exploitation. In themodification, it is being stated Rechenberg's one fifth mathematical formulation probabilities function. The concern that maximum dimension is Doppler Effect in this existing algorithm andintroduced a Modified Bat Algorithm with Doppler Effect. Thealgorithm provides many advantages over existing algorithms.

Day- 02: 25 December 2019, Time: 09.00am, Technical Session- 03, Parallel Session- 01

Venue: Seminar Hall (SD), Session Chairs: Prof. Md. Mijanur Rahman (JKKNIU), Dr. Md Abdul Masud (PSTU)

PID: 01 **Bengali Word Prediction and Sentence Completion Using GRU: An Extended Version of RNN on N-gram Language Model**

Omor Fuva Rakib, Shahnewaz Ahmed, Md Azim Khan, Asif Karim, Kumar Das, Khan Mohammad Habibullah

Abstract—Textual information technology is tipping the scale and we are at the cusp of a new era. One of the most prominent mediums of communication throughout the world. People occupy a lot of time sending emails or additional messages. Word prediction and sentence completion is a very important task in natural language processing and advanced one. To make textual information technology more progressive and efficient Predictive Language Model 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 paper, we have proposed a method that will predict and complete sentences in the Bengali word in Bengla language. and also it can suggest the corresponding sentence to contribute to this technology of word prediction and sentence completion. We have used Recurrent Neural Network (RNN) and Gated Recurrent Networks or in short Abstract—Textual information technology is tipping the scale and we are at the cusp of a new era. One of the most prominent mediums of communication throughout the world. People occupy a lot of time sending emails or additional messages. Word prediction and sentence completion is a very important task in natural language processing and advanced one. To make textual information technology more progressive and efficient Predictive Language Model 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 paper, we have proposed a method that will predict and complete sentences in the Bengali word in Bengla language. and also it can suggest the corresponding sentence to contribute to this technology of word prediction and sentence completion. We have used Recurrent Neural Network (RNN) and Gated Recurrent Networks or in short Abstract—Textual information technology is tipping the scale and we are at the cusp of a new era. One of the most prominent mediums of communication throughout the world. People occupy a lot of time sending emails or additional messages. Word prediction and sentence completion is a very important task in natural language processing and advanced one. To make textual information technology more progressive and efficient Predictive Language Model 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 paper, we have proposed a method that will predict and complete sentences in the Bengali word in Bengla language. and also it can suggest the corresponding sentence to contribute to this technology of word prediction and sentence completion. We have used Recurrent Neural Network (RNN) and Gated Recurrent Networks or in short

PID: 08 **Automated Detection of Plant Diseases Using Image Processing and Faster R-CNN**

Shanmar Tasnim Cynthia, Kazi Md. Shahrukh Hossain, Md. Nazmul Hasan, Md. Asaduz-zaman, Ashik Karim Jony

Abstract—The economy of Bangladesh highly depends on the field of agriculture and the production of the crops over there. Due to the lack of proper disease identification has become one of the major problems in producing the crops. Wrong identification or late identification can cause excessive loss of the production as well as in the financial sector. Therefore, the detection of the plant diseases is very important. Nowadays, the use of image processing is increasing rapidly in the detection of the plant diseases. Automatic detection of the plant diseases using image processing can reduce their workload and the fear of loss of their production. This paper presents a method that detects diseases in plant leaves using image processing and Faster R-CNN. The proposed Faster R-CNN model is trained on the basis of more than 18286 images. 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

Venue: Room-307, Session Chairs: Prof. Md. Mijanur Rahman (DU), Dr. Ashraful Alam (BRAC)

PID: 42 **A comparative study of a PEMFC, Battery, Super-capacitor based energy source owing to hybrid vehicle**

Md. Monirul Islam Tusher, Mohammad Ehsanul Hoque, Mohammad Jalal Uddin, Md. Mahmudul Hasan, Md. Mohin Uddin Talukder

Abstract—A Proton Exchange Membrane Fuel Cell hybrid electric vehicle (PEMFCHEV) occupies several benefits, environmentally friendly, high energy conversion efficiency, and low operating temperature. In this paper, a comparative study of hybrid vehicle energy sources simulated Proton Exchange Membrane Fuel Cell (PEMFC, Battery, and Super-Capacitor (SC) hybrid energy production, which is substantiated within PEMFC-Battery, PEMFC-Super-Capacitor (SC), and PEMFC-Battery-Super-Capacitor (SC) hybrid energy source. The PEMFC is the primary energy source, and the battery and SC are used as an auxiliary energy source. The hybrid energy device to support continuous energy to support traction motor for proper synchronous speed. A typical arrangement of FC, Battery, and SC hybrid energy supplies, which clarifies its better competence, is also simulated. After the simulation, DC-link voltage, dissipated power, and AC output voltage of linverter has been observed. Besides, the PEMFC-Battery-SC hybrid energy source has been found to be the best option for the fast load shift, battery, and supercapacitor SC get constant power. Also, it is the main achievement of this project. Since state of the art of entire types of energy suppliers employed in FCHEVs, assimilate to the planned PEMFC, Battery, and SC hybrid energy supplies, which clarifies its better competence.

PID: 202 **Regression Algorithms: Rotation Forest and Gaussian Naive Bayes Ensemble Efficiency in Malware Detection**

Jesmin Akhter, Md. Tofael Ahmed, Ahmed Iqbal Pritom, Shihabuzzaman, Arnab Rahman Chowdhury, Mehrab Zaman Chowdhury

Abstract—In recent years, air pollution has become a monitory problem especially for least developed countries like Bangladesh. The devastating impact of air pollution on World world nation's people's health and the environment is undeniable. Due to the lack of proper air quality monitoring system in Bangladesh, in this paper we proposed towards the design and development of outdoor air quality improvement system, very few approaches have addressed the same issue for the indoor gas emission supervision. Therefore, today's world is moving towards the development of smart cities, so we have proposed a system which will be helpful to monitor and improve the indoor air quality. Considering many aspects of indoor air pollution in Bangladesh, in this paper we propose a method of indoor-CO emission monitoring system gives a threshold voltage for the residential level. Our tendency is to closely observe the rate of gas emission in hospital households of Bangladesh and implement a device to ensure a sustainable indoor gas surveillance application. In our study, sensor data were gathered and processed for the duration of a day and a comparative study was presented to find the major contributing factors of indoor air pollution.

PID: 194 **Rice Leaf Disease Detection Using Machine Learning Techniques**

Kavcher Ahmed, Tasnia Rahman Shahid, Syed Md. Imtiaul Alam, Sifat Momen

Abstract—Rice is one of the most consumed staple grains consumingpopulation in the world. Bangladesh depends greatly on rice for itseconomy and for meeting its food demands. To ensure healthyand proper growth of the rice plants it is essential to diagnose their diseases in time and prior to applying required treatment tothe affected plants. Since manual detection of diseases costs alarge amount of time and labour, it is inevitably prudent to implement a system which can detect the diseases in a computationally efficient and automated approachwe. Three differ-ent 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 K(NN)-Nearest Neighbour, J48(Decision Tree),Naive Bayes and Logistic Regression.Decision tree algorithm (J48) showed the highest cross validation accuracy of over 97%when applied on the test dataset.

Day- 02: 25 December 2019, Time: 02.00pm, Technical Session- 02 , Parallel Session- 04

Venue: Room-305, Session Chairs: Prof. Dr. Md. Omor Faruk (AUST), Dr. Ahmed Al Mamun (GUB)

PID: 52 **Simulation Based Compatibility Analysis between Conventional and Hybrid Power System in Remote Area on Point of Stability**

Md. Shahinur Alam Hemel, Akib Mostafee Refat, Kazi Firoz Ahmed, Dewan Mahnur Hasan Chowdhury, Md Mahbubur Rahman

Abstract—The proposed research work interfaced traditional grid with renewable microgrid system where renewable resources are working as backup during normal situation. A flexible function is developed as controller unit or decision maker for the switching purpose. With the various loads it was observed under voltage and over voltage occurred which respect to time and the stability point difference was analyzed for conventional and hybrid model.

PID: 54 **Feasibility Study on Solar Bi-facial Technology and Plant Shoot Configuration in Perspective of Bangladesh**

Md. Rashidul Islam, Mohammad Nasim Khan, Abdullah Al Mamun

Abstract—Renewable energy

PID: 101 **Mini to Moderate Vibration Sensitive Cast-Ethylene Electricity Generating Floor Tile**
Nafisa Tasnim Eva, Fatema Tuz Zohora Sumi, Md. Sohel Ali Sikder

Abstract — The current contribution presents the development and implementation of a tactile electricity generating floor tile which is capable of producing electricity from human footsteps or any movement of human body. The tile is made of cast-ethylene which is a mixture of ethylene vinyl acetate and magnetic. The production of electricity can be tuned by changing the coil turns, magnetic strength, and number of tiles. The tile is also capable of producing electricity from very low vibration through the magnetic flux and loop current principle. The experimental results show that the tiles after rectifying and can be used for powering miniature devices. The proposed transducer can be used in many applications, such as, in smart floor, energy harvesting shoes, and in many other innovative and interactive ways. It is expected that the proposed transducer functionality and performance can be improved by using different magnetic materials and coil turns. The proposed transducer is very efficient in the field of sustainable development of energy shortage and scarcity of energy.

PID: 104 **Micro Wind Turbine as a Renewable Power Source in Bangladesh**
Fayes Ahmed Sazzad, Asadullah Al Galib

Abstract — Use of micro turbine is rapidly growing because of its attractive contribution on almost zero fuel emissions and low noise. Micro turbine is a small combustion turbine which is about the size of a refrigerator or large utility. We energy capturing capacity of wind generator is higher compared to photovoltaic generator. Bangladesh is a developing country and the demand of energy is increasing day by day. Most of the Bangladesh need having 60% of electricity. In this study, we have considered micro wind turbine as a source of electricity and analyzed its feasibility with respect to our country and power sources.

PID: 107 **Optical Properties of Plasmonic Metal Grown on Al-Doped ZnO Shaped Photonic Crystal Fiber**
Sumon Saha Partha, Md.Anwar Hossain, Nguyen Hoang Hai

Abstract — In this paper, we have proposed a novel design of photonic crystal surface plasmon resonance (PCF-SPR) sensor for refractive index (RI) detection in terahertz (THz) regime. The sensor is based on the deposited outside of the fiber structure to detect the changes in the analyte refractive index. Using the finite element method (FEM) with perfectly matched layer (PML) boundary condition, we investigate the optical properties of silver, gold, zinc and copper. Also we have simulated, investigated and compared the sensor. The proposed S-shaped PCF-based SPR sensor provides maximum wavelength interrogation sensitivity of 3000 nm/RIU, 2000 nm/RIU, 1000 nm/RIU and 1000 nm/RIU for silver, gold, zinc and copper, and maximum amplitude interrogation sensitivity of 1000 RIU-1 for silver, gold, zinc and copper, respectively. The sensor can detect the analyte RI in the range of 1.33 to 1.38. The proposed sensor has a simple design, DMCF and machine to machine communication. Therefore, this types of wearable SPR sensor will open a new horizon for industry 4.0.

PID: 108 **Expanding The Area of Light Fidelity**
Md. Shahriar Rahman Fahim, Md. Sohel Ali Sikder

Abstract — At present, Wireless technology is used all over the world to ensure the availability of the internet. Although because of the shortage of bandwidth, we are facing a problem in connecting to the internet. Light Fidelity (Li-Fi) is a new technology which is used to solve the problem of bandwidth and internet availability. Its short Light Fidelity is called Li-Fi. In this proposed,data is transferred through LED bulbs. Data transfer rate of Li-Fi is very much faster than other technologies. Its data transfer rate is about 100 GB/s. Its range of Li-Fi is small it can be extended by using wireless access points and access points. It is a bi-directional, high speed and fully networked technology. Li-Fi is a part of optical wireless communication. Li-Fi is the technology that will be among to do this bypassing the LEDs smartly and Gaussian mirrors to accumulate area and range. Li-Fi is a VLC (visible light communication) system that transmits data through illumination by varying the data fast. We propose the implementation of Li-Fi technology in the area of Bangladesh. Li-Fi is a new technology that can become, in a house or in hallways. With the coming of industry 4.0, Li-Fi has been studied,where the data transmission is done through illumination by varying the data fast. Li-Fi is a new technology that can be used alongwith existing communication networks to increase the bandwidth.

Day: 02: 29 December 2019, Time: 08.00am, Technical Session: 03, Parallel Session: 03
Imran Nasim Bhuiyan, Mohammad Rakibul Hasan, Mohammad Rakibul Islam, Dr. Salma Parveen Liza

PID: 39 **Design and Implementation of an Android Device to Control Refrigerator Temperature Using Peltier Effect Cooling System and Control Home Appliances**
Md. Rakibul Hasan, Mohammad Rakibul Hasan, Mohammad Rakibul Islam, Mohammad Rakibul Hasan, Dr. Salma Parveen Liza

Abstract — Most of the times, the family members act as the caregiver of elderly, bedbound people in the house. Sometimes they have to leave the house for their work and the bedbound person has to stay alone at home. It is challenging for them to attend to the elderlies if the caregivers are not present. It is also difficult to share their needs if caregivers are not close to them. This research is to design an assistive device that will help the caregivers to monitor the bedbound person's health and also help the bedbound person to communicate with the caregivers and relatives. The bedbound person will have a wearable device that will measure the heart rate, body temperature and blood pressure. The measured data will be sent to the server. It is transmitted to the receiver device via Bluetooth. Then the receiver device plays a different tune for each of the measured data. The caregiver will hear the tune and will be able to know if the patient's health condition is normal or not. The caregiver can also control the lights, fan, etc. by the receiver. The receiver can also be used to control the temperature of the refrigerator using Peltier effect.

PID: 139 **A GSM Based Traffic Monitoring System for SmartCities**
Mahmud Hossain, Md. Sohel Ali Sikder, Mohammad Rakibul Islam

Abstract — The new development of the population and anomalies procedure called Industry 4.0 and Smart City, the traffic problem is increasing day by day. Traffic congestion is a problem in most of the cities and has an obvious unwanted impact on the economy and environment. Traffic violation is a common behavior & increasing day by day in developing countries. By furthermoreliving is becoming a more complicated and busy day by day. Traffic violation is a common behavior & increasing day by day in developing countries. By furthermore, the traffic violation is also increasing

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