2017 POSTER SESSION
Session Organizers: Ms. Ines Abdennaji and Mr. Sumit Chhabria
IAS Annual Meeting 2017
Poster Session
Monday, October 2, 2017
Hyatt Regency Cincinnati, Cincinnati OH
Location: Sungarden

Poster Session Organizers:
Ines Abdennaji, CMD Humanitarian Programs Chair
Sumit Chhabria, CMD Robotics Demonstration Contest Chair

Poster Authors:
Robotics Demonstration Contest Participants
Myron Zucker Design Contest Participants
Humanitarian Contest Participants
Thesis Contest Participants
Invited Students
1. **Title:** EN2560 - Internet of Things Design and Competition  
**Presenter:** Rajasegaran Jathushan, University of Moratuwa, Moratuwa, Sri Lanka.  
**Abstract:** Digital Irrigation Automation (DIA) enables users to water their plants or farms automatically and monitor the temperature, moisture levels. User will be able to communicate with DIA via website, android app, and simple SMS due to the lack of smartphone usage in farmers. Having weather forecast embedded in the system based on device location, enables farmers to use water efficiently and farmers don't have to go to farms daily to monitor the conditions of plants and water, DIA can do these works automatically based on specified thresholds. All the sensor data are collected to server for processing and decision making.

2. **Title:** Study on Motion Control of Magnetic-Geared Dual-Rotor Motor Used for HEVs  
**Presenter:** Honghui Wen, Southeast University, School of Electrical Engineering, Nanjing, P.R. China.  
**Abstract:** The magnetic gear has been widely concerned by researches in the field of electric machines. Unlike the mechanical gears, the magnetic counterpart can effectively avoid the mechanical abrasion, which makes the whole system more reliable. Precisely, there is a neat analogy between the kinematic features of the planetary gear and the coaxial magnetic gear (CMG). Such an analogy implies that the magnetic-geared dual-rotor motor (MGDRM), which combines a permanent magnet synchronous motor (PMSM) and a CMG, can function as the PSD of the hybrid system. With respect to the control aspects of the MGDRM, the current vector control has been the mainstream due to its mature theory and high application degree.

3. **Title:** Power Factor Improvement for Large Industrial Load while using Static VAR Compensator  
**Presenter:** Shaurya Sheth, Pandit Deendayal Petroleum University, Gandhinagar, India.  
**Abstract:** The question of voltage quality is rapidly increasing. New technologies are introduced and we are facing many new power quality requirements. Flexible alternating current transmission systems (FACTS) are modern devices in power transmission and grid stability. Our project deals with the modelling of a static var compensator (SVC) for large industrial load. For this purpose, Matlab/Simulink is used. SVC is designed for the implementation in a three-phase power line model and voltage is measured at different firing angle.

Applying an SVC in a power system mainly aims to increase the power transmission capability with a given transmission network from generation to the loads. Since SVC cannot generate or absorb real power, the power transmission is affected indirectly by voltage control. Therefore, SVC can be used to maintain voltage at or near a constant level, improve the power factor...
stability, improve power factor, correct phase unbalance. Several simulations and tests have been performed to examine the function of the SVC system as a whole.

4. **Title:** MPC-Based DC-Link  
**Presenters:** Xavier St-Onge, Christian Gilles Richard and Katie McDonald, University of New Brunswick, Fredericton, New Brunswick, Canada.  
**Abstract:** This project presents the development and performance of a new active multi-port dc-link for applications in permanent magnet generator (PMG)-based wind energy conversion systems (WECSs). The proposed dc-link is developed as a mid-stage between a 3Ø multi-level ac-dc generator-side power electronic converter (PEC) and a 3Ø 6-pulse dc-ac grid-side PEC. The design of the dc-link is based on a multi-port converter (MPC) topology. The employed dc-dc PECs are operated independently, to achieve separate voltage-transfer ratios and process continuous or discontinuous input voltages. Test results have shown that the proposed dc-link is capable of processing continuous and discontinuous dc inputs, while producing a high quality and regulated dc output under various conditions. Performance results also demonstrate that the proposed dc-link has negligible impacts on the harmonic distortion at the terminals of the PMG, along with the operation of the grid-side PEC.

5. **Title:** GridTeractions: Simulation Platform to Interact with Distributions Systems  
**Presenters:** Cesar Augusto Trujillo Meneses and Cristian Camilo Zambrano Rincon, Universidad de Los Andes, Bogotá, Colombia.  
**Abstract:** GridTeractions is a scalable framework that eases the process of performing studies and analyzing results in distribution systems in order to improve the teaching methodology and generate valuable knowledge for industrial and commercial applications. GridTeractions provides a hardware-software platform to interact with simulated distribution systems in real time. The interactive approach, the detailed modeling and continuous results emulate the real systems' operation. This feature allows realistic feedback for testing and design of future automation strategies. Systems are modeled with Open DSS scripts and managed by DSSim-PC in order to run simulations in time series with phase domain results, allowing users to continuously evaluate the electrical variables. As the system is based on Open DSS many phenomena can be studied in areas such as fault location and system reliability, demand response, renewable energy and EVs penetration, and voltage regulation among others.

6. **Title:** Gearo-E-Bike  
**Presenters:** Nikhil K. George and Akash T. John, Vimal Jyothi Engineering College, Kannur, Kerala, India.  
**Abstract:** Increasing demand for non-polluting mechanized transportation has revived the interest in the use of electric power for personal transportation. A low-cost alternative to an automobile is a bike. However, the use of bike has been limited to very short trips or as a
recreational activity. This report describes the working of an electric assisted bike which comes with a gear box. The e-bike is provided with a 4-speed sealed type gear box with output and input shaft on the same side. The e-bike is powered by a 750W BLDC motor of 24V. The speed of the motor is controlled with the help of a throttle. The rotation of the motor is delivered to gear box by providing twin teethed socket on motor shaft and input gear box shaft and they are connected by a twin linked chain for reducing slip. Then the rotation is delivered to the rear wheel from the output shaft of gear box by using another chain. The e-bike is also provided with an accident detection system which will send a message containing location details to nearest hospital when an accident occurs.

7. **Title:** LIFE-MET (Life Saving Helmet)  
**Presenters:** Aravind Sankar, Haritha Akkare Veettil and Shelma George, Vimal Jyothi Engineering College, Kannur, Kerala, India.  
**Abstract:** Two-wheeler road accidents are very common nowadays, every now and then you could see someone losing their life because of the negligence. One of the major negligence is driving two-wheeler without wearing helmet or rash driving. Driving department as well as other social awareness group keep on propagating the importance of driving with helmet, but all the messages goes in vain, still the driver prefer to drive without helmet which is because of sheer ignorance. In this new innovated helmet rider can only start the two-wheeler once the helmet is worn and the rider should be free from alcohol. Also, we are incorporating GPS and GSM module which will ensure alerts, so that immediate rescue operation will be done to avoid other untoward incidences and also this new innovation which saves the life of the two-wheeler rider, is named as “LIFE-MET” (Life Saving Helmet). A helmet is designed which protects as well as it connects during emergencies, this unique feature is not there with any commercially sold helmets in the market. The uniqueness in connecting the emergency centers like; Police Station, Hospitals, Fire Force, is not there with any product which compete with in this segment. Till date the campaign is only to wear helmet while driving. Now LIFE-MET ensures to be alcohol free and start a vehicle after wearing the helmet.

8. **Title:** Wirelessly Charged IMDs  
**Presenters:** Robin K. Thomas and Jithin Vidya Ajith, Vimal Jyothi Engineering College, Kannur, Kerala, India.  
**Abstract:** Implantable Medical Devices(IMD) have a limited lifetime of roughly 7 to 10 years where its battery needs to be replaced in order for it to function continually. The limited battery life causes the patient to be subjected to an operation every time the battery life comes to its end i.e. an invasive operation is performed every 8 years on average. This puts the patient in danger and discomfort. Furthermore, there are health risks including infection at the surgery location. Patients may be allergic to anesthesia and experience swelling and bruising. More extreme risks include collapsed lungs, damage to blood vessels, etc., at the site of operation. To solve this problem, wireless charging becomes a very crucial asset. If wireless charging is integrated with
bionic organs or implantable devices, the only operation the patient would undergo is the implantation process and up-gradation of technology.

9. **Title:** Eco Vending Machine  
**Presenters:** Thakkar Harsh Kiritbhai and Shah Devam Nrupesh, Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar, India.  
**Abstract:** The main purpose of this project is to create a pollution free atmosphere where every person is equally involved. In terms of financial aspects, government spends enough amount of money for cleaning environment, spreading awareness. The same can be done with lesser efforts and money. This project demonstrated that when a user put any item it will be scanned and will detect if there is any metal or not. After the detection, the user will get reward depending upon the amount of metal (or garbage). Reward can be in the form of chips packets or account balance which he can issue later. The vibration sensor connected to it takes care of the security of the system.

10. **Title:** Eco-Compost  
**Presenter:** Nahla Khaireddine, Higher Institute of Applied Sciences and Technologies (ISSAT), Sousse, Tunisia.  
**Abstract:** Humans are regularly harmed by pollution. Even low doses of environmental pollutants can threaten our health. Chronic respiratory disease, lung cancer and other diseases may be directly related to the effects of even small amounts of environmental pollutants on our bodies. Hunger and poverty also can be found in some corner of Tunisia, affecting some children, and this problem often plays out in the classroom. Hungry children struggle to concentrate in class because of the daily headaches and stomach aches.  
So, this pushed us to think about a system that reduce all of this problem and explore them in order to provide a supportive and favorable environment. The purpose is that we will treat and recycle the wastes, Paper, cardboard, food,... on site with gain of bio-gas and compost.  
The Eco-Compost treats two phenomenal problems:  
Eco: that comes from "Economy", which our goal is to reuse the wastes from houses, gardens, animals... to produce gas that will be used to produce electricity which is our century need in our country. Also, the produced gas (methane) could be used in many other uses.  
Compost: the rest of the waste after methanisation (methane gas release) will be used as compost: the ground material, which should in all cases be valued on the spot, is used to improve the quality of the compost by mixing it with the kitchen waste.  
It also allows producing mulch: spread at the foot of your plants or your hedges, it retains moisture and nourishes the soil. Methanisation, or anaerobic digestion, is the decomposition of organic matter without oxygen by our Eco-Compost.  
This decomposition produces a gas, called a biogas, made up of methane and carbon dioxide: Methane (CH4) at 60% , Carbon dioxide (CO2) at 40%. 
11. **Title:** Bluetooth based remotely controllable audio/video surveillance robot  
**Presenter:** Magalle Hewa Vinoj Yasanga Jayasundara, University of Moratuwa, Moratuwa, Sri Lanka.  
**Abstract:** The system is a robotics application which makes use of a robot, whose movements can be remotely controlled using a computer via Bluetooth. The controller of the robot can guide its movements by referring to the live video feed transmitted from an IP camera mounted on the robot and if necessary, the video feed can be used or stored for surveillance purposes. Also, if user requires, high quality photos can be taken and transmitted instantly. The robot has a storage facility, which can be used to either deliver objects to an intended destination, or to retrieve objects from remote locations using a robot arm mounted onto the robot. There are five major modules contributing to the functionality of the system, the robot, the controller software, the camera, the Bluetooth connectivity and the database. The main technologies that were used for the system are, Robotics and automated systems, Bluetooth communication and Wi-Fi communication. The collision avoidance system is a vital feature of the system, which avoids imminent collisions of the robot with obstacles in its path. Incorporation of voice control commands, image processing and object recognition, cloud connectivity and RF technologies are the major improvements that are planned to be implemented in the future.

12. **Title:** Automated Programmable Waterfall Display  
**Presenter:** Abhijeet Gupta, G. H. Patel College of Engineering and Technology, Anand, India.  
**Abstract:** Automated Programmable Waterfall Display is a controlled mechanism for generating patterns, image, letters...etc, through water droplets falling under the effect of gravity in a programmable manner. It can be thought of as an inkjet printer suspended in the air that releases droplets of water rather than ink. Thousands of this water droplets work together to create the desired graphics in a truly elegant and mesmerizing waterfall. It consists of solenoidal valves which are triggered by the controlling device which turns them ON and OFF. These individual valves act like a bit of information which thereby helps in generating patterns or images.

13. **Title:** EMG (ElectroMyoGraphy) based robotic arm for amputees, paralyzed and multipurpose applications with 6 DOF.  
**Presenter:** Masud Mamoon, University of Engineering and Technology Lahore, Lahore, Pakistan.  
**Abstract:** A large number of amputees and paralyzed are among us who are not able to compete with others only because they are held back by the fact that some part of their body is not fully functional. World Health Organization (WHO) estimates that there are 40 million amputees throughout the world, 30 percent of which are upper limb amputees. While there is no commercially available solution for the paralyzed, the prosthetic limbs available for the
amputees in the market are too expensive and only available in developed countries. The success of this project lies in providing robust gesture classification using Myoelectric signals acquired using surface electrodes which will then be used to drive a complete low cost human arm having 6 Degrees of Freedom (DOF). The gesture classification will also be used for other applications such as driving a wheel chair for amputees and using a mounted robotic arm on the wheel chair for performing basic tasks. This project also aims exploring the control of the limb for paralyzed using externally applied Myoelectric signals by Trans-cutaneous Electrical nerve stimulation(TENS) Pads. Cost is one of the most important aspects of this project, and the target is to create a product that is affordable good for most amputees and paralyzed.

14. Title: Light Up Miri
   Presenter: Kong Sheng How, Curtin University, Miri, Sarawak, Malaysia.
   Abstract: In Sarawak, there are a lot of rural areas with more than a few hundreds of households living in poverty. Most of the households from these rural communities do not have electricity supply or face the problems of electricity shortage which brings up some troubles in carrying out night activities such as studying, cooking and etc. Therefore, this proposed initiative of Light Up Miri aims to reach out the rural communities in Miri, Sarawak, to raise awareness of the importance of education and create an interest of the communities towards engineering and sciences. In addition, a solution - rechargeable and portable solar lamp is proposed for the rural communities to carry out night activities without any harm to their lives.

15. Title: Lighting Up Sirumalai Hills
   Presenter: Aneesh Rajeev, Vellore Institute of Technology, Chennai Area, India.
   Abstract: Sirumalai is a region of 60,000 acres (200 sq km ) situated at Tamil Nadu, India. Majority of the household in this area does not have access to electricity. IEEE in association with Litter of Light (NGO) took initiatives to provide light to these under served communities. The first phase of this project covering 50 houses has been done on June 2017. There are more the 450 similar households here at the hill which does not have access to electricity. IEEE and Liter of Light have plans to cover these houses in different phases.

16. Title: DC Microgrid for Residential Building
   Presenters: Rajeev Kumar Chauhan and Bharat Singh Rajpurohit, Indian Institute of Technology Mandi, Himachal Pradesh, India.
   Abstract: The project is based on a new demand-side management scheme for the autonomous DC microgrid for future building. The DC distribution system is considered as a prospective system due to the increase of DC loads and DC power sources such as solar system, and battery bank. The batteries respond to the changes in a power imbalance between solar photovoltaic generation and demand within an autonomous DC microgrid. The power loss during charging/discharging of the battery is the great challenge for the autonomous DC microgrid supplied by solar system. It decreases the system efficiency. The control objective of the
The proposed demand-side management scheme is to use the solar energy more efficiently. The most obvious features such as load scheduling of deferrable load from non sunny to sunny hours for directly utilize the solar power, and approaching the desired state of charge of the battery bank by controlling the cycle based load and other controllable load makes it more advance. The demand-side management scheme decreases the use of battery power. This reduces the charging-discharging cycles of the battery bank. The outcomes of the demand-side management scheme are (i) it reduces the power losses in the battery (i.e. improves the system efficiency), (ii) it reduces the size of the battery bank and PV plant, (iii) it also decreases the capital cost of the system, (iv) it also decreases the peak demand of the building. The energy demand of the project is 2.7 kWh/day with the conventional and demand side management scheme. The cost of the solar power plant and battery bank has been reduced 36.36 % and 25% respectively. While customer achieves 32.62% system cost saving with the demand side management scheme as compared to conventional scheme. There is a 36.36% savings in the cost of the solar system while the saving in battery cost is 25%.

17. Title: Formation of the Club between Zhejiang University IAS SBC and the TBEA Company.
Presenter: Nan Shang, Zhejiang University, Hangzhou, Zhejiang Province, P.R. China.
Abstract: The presentation gives an overview about Zhejiang University IAS SBC chapter, as well as its past and future activities. Corporations between Zhejiang University IAS SBC and the TBEA Company are introduced, including the information about TBEA company, the activities we organized in Zhejiang University with TBEA and our plan for visiting the TBEA company in the near future. Meanwhile, academic activities hold by Zhejiang University IAS SBC chapter are displayed. Lastly, volunteer businesses those hold by IAS and Zhejiang University IAS SBC chapter members have taken part in are presented as well.

18. Title: Data Analytics for Power Network Anomaly and Fault Detection.
Presenter: Xu Jiang, University of Strathclyde, Glasgow, United Kingdom.
Abstract: Low observability on distribution networks can obscure the signs of incipient faults which can develop into costly and unexpected plant failures. While low cost sensing and further reaching communications, infra-structure is improving this, it is also highlighting the complex nature of operational fault signals, a challenge which entails extracting anomalous regions from operational data before classifying the underlying fault. Here a solution in the form of a Bayesian online changepoint detection model is presented allowing a Deep Neural Network to classify the resulting segmented signal. MV fault and abnormality datasets are used to demonstrate its capability for operational detection.
19. Title: EEG Based Development Board  

Presenters: Rakibul Islam Chowdhury and Celia Shahnaz, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh  

Abstract: For the disabled and handicapped, the world of brain-computer interface has opened a new horizon to lead an unassisted and least supervised life. But the use of prosthetic limbs and artificial organs are still not commercially available in most of the countries. Recently developed some other brainwave based systems are mostly expensive, immobile or task specific. In order to overcome these problems, analogous to the pen-drive, we have focused on developing a low cost control unit namely “Brain-drive” which transforms ones thoughts into output digital electric signal. Certain thoughts (mental tasks) with hard eye blinking (neural driven physical outcome) develops certain action potential, no matter the eye blinking is visible or not, it creates a significant change in electroencephalogram (EEG) or brain signal. Single channel EEG signal is collected from frontal lobe as it plays a vital role in voluntary movement using a wearable Mindwave Mobile from Neurosky. The EEG data thus recorded is preprocessed to reduce the effect of noise and artifacts and then analyzed in time domain. A grid of cells are displayed on a monitor in front of the subject, which is connected to individual digital output pin onboard an embedded system. To select a cell, a user just needs to look and generate a sustainable eye blink which can easily be identified from the raw value of brainwave. Since eye blinking can be both conscious and involuntary, automatic periodic eye blink of very low frequency oscillation is removed to avoid unwanted selection of command. Unlike webcam based eye blink detector, Brain-Drive captures the signal for blink rather than the visual output of blinking. The system can be trained for person specific customized performance, considering special needs of a disabled or handicapped people who cannot communicate with the outside world using voice, motion or other methods. With the help of cognitive command, the ‘Brain-Drive’ can be used to control wheelchair, home appliances and even industrial machines.

20. Title: IEEE Technical Forum for Industry Academia Partnership (TFIAP)  

Presenter: Ines Abdennaji, National Engineering School of Gabes, Tunisia  

Abstract: The Technical forum for Industry-Academy partnership is an international platform/Event where Engineers, Professionals, Entrepreneurs and Researcher from all over the world meet to enhance the Relationships between IEEE IAS Chapters (Academic), Industry and Society. It’s a platform to encourage academia, Industry, Society and Government to support each other for finding solutions of existing problems of National level. Technical Forum for Industry Academia Partnership comprised of B2B(Business to Business Meetings), Shark Session for Young Entrepreneurs, Industrial Exhibitions for showcase of Products, Poster Exhibitions for Undergraduate/ Graduate Students and Technical Research submissions. In Short IEEE TFIAP is an amazing way to engage Industry, Academia, Society and Government for Innovation, Research and upgrading society standards in countries. TFIAP is value addition to Society with the collaboration of Industry Academia and Government.
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2017

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