





History of the Prastuti

The inception of Prastuti dates back to the year 2001 when it was started as an All India Students Paper Presentation contest organized by Electrical Engineering Society (EES). The idea of Prastuti as an event was brought up into realization by **Prof S.N. Mahendra** of Electrical Engineering Department. And since then there was no looking back. Over the years Prastuti has grown in stature and has made its impact across the nation. We have seen hundreds of papers presenting innovative ideas put forward by the young minds of the nation. With the sole vision of Prastuti being Growth of research instincts and inculcation of analytical and innovative streak amongst the scholars of technical institutions. We expanded our perspective and introduced various new events thereby encompassing myriad walks of the technical and professional word.







Paper Presentation

Description

Prastuti was commenced in 2001 as a paper presentation contest and has since evolved in to a much greater techno-management fest, but its core event remains the same; the paper presentation event is the centre piece of Prastuti.

Paper presentation is an important aspect of research which ensures that the whole world knows about your inventions and discoveries. As a budding researcher it is very crucial to know the way a paper is presented. The participants are given a chance to present a paper on their own research or even a small project. The judgement is done on the presentation skills so as to motivate the participants to inculcate the habit of paper presentation and motivating them for research. The participants would also get an idea on importance of doing quality research.

<u>Structure</u>

Students will present their paper in front of judging panel (consisting of professors) and scores will be given on different parameters.







Poster Presentation

Description

Posters are a legitimate and popular presentation format for research They are visual communication tools that serve as a summary of your work and an advertisement for your research area. They effectively communicate concepts and data to an audience using a combination of visuals and text. Poster Presentation allows the author to meet and speak informally with interested viewers, facilitating a greater exchange of ideas and networking opportunities than oral presentations. Poster presentations often are the first opportunities for budding young researchers to present their work at important scientific meetings and preparatory for publication in a peer-reviewed journal.

This competition gives you a chance to present your poster orally which will help you to be more effective in conveying your message and engage in conversation with colleagues to get your main point(s) across to as many people as possible.

Structure

Students will present their poster in front of judging panel (consisting of professors) and scores will be given on different parameters.







SIMULIM

Event Description

Finding out the mathematical expressions of various electrical parameters of a circuit is very complex task and a lot time consuming. Any sudden change in the steady-state circuit operations like load changes, fault occurrences etc results in dynamic behaviour and new set of mathematical expressions. It is not realistic to solve these complex equations every time the circuit dynamics change. Virtualization of the circuits help solve complex problems within minutes also giving a change to study dynamic behaviour with ease. Simulim is the event which introduces the budding electric engineers to the world of electrical stimulation. The event focuses mainly on the development of simulation models of various circuits thereby making the participants to explore different simulation blocks and giving an idea of many things which can be done using simulation.

Event Structure

The event and workshops are mainly concerned to power electronics and will contain simulation and Hardware implementation of power electronics circuit.

Total No. of workshops: 4

- Workshop1-Basic introduction to power electronics/And installation of matlab/basic circuit design in Simulink.
- Workshop2-simulation of AC-DC converters/controlled rectifiers.
- ▶ Workshop3- simulation of DC-AC converter and DC-DC converters. After 3 workshops we will conduct first round of the event based on simulation. Few teams will be Selected for the final round and we will take one workshop for them related to hardware implementation.
- Workshop4- Hardware implementation/Basics of DSO, Function Generator. At last we will \succ take the final round consisting of some hardware implementation.







CONSILIUM

Description

Electronic design and applications are a vital area of electrical engineering, encompassing the experimentation, design, modelling, simulation and analysis of single devices or circuits as well as complete signal processing systems. The fundamentals and implementation of digital electronics are essential to understanding the design and working of consumer/industrial electronics, communications, embedded systems, computers, security and military equipment. Devices used in applications such as these are constantly decreasing in size and employing more complex technology. It is therefore essential for engineers and students to understand the fundamentals, implementation and application principles of digital electronics, devices and integrated circuits.

<u>Structure</u>

• A quiz on day 1

• Two problem statements - PS1 will Be out after the 3rd workshop and they will have to submit it before day 1. And PS2 will be on spot design and implementation of some digital system.

- Workshop 1: Introduction to digital electronics, Number system, Boolean algebra, Digital logic gates & K map.
- Workshop 2: Combinational circuits- adder, subtractor, encoder, decoder, multiplexer, demultiplexer...
- Workshop 3: Sequential circuits latch, flipflop, counters, registers
- > Workshop 4: FSM, and some real application-based problem solving.





Recognizance

DEPARTMENT OF ELECTRICAL ENGG.

oras

Event Description

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Recognizance focuses on applying machine learning algorithms to electrical domain such as those within power system including load forecasting, power production forecasting, fault detection etc. The event will also be focusing on applications related to solar power prediction and adaptive power systems. We expect participants to learn about application of machine learning without being restricted to only theoretical knowledge.

Importance of ML:

In today's world machine learning and deep learning have become intrinsically linked with every facet of engineering. Electrical Engineering benefits greatly from this because we, as electrical engineers, need to be well versed in all the modern technologies in our field. It allows for adaptive and self-correcting control systems that can be used more reliably and efficiently. This event helps us take the first steps into applying the concepts of Machine Learning in the domain of Electrical Engineering.

<u>Event Structure</u>

Event will consist of two rounds. The problem statements of both rounds will be released online on the website at the time of contest. Each contest will last for 24 to 48 hours and all participants can submit their submissions via google forms.

Round One: Qualifier

First round will have a problem statement where we would have a basic regression problem for any electrical parameter detection such as fault detection. As this is a qualifier, we will only check for functional models and most participant with good scores will be allowed to participate in the finals.

Round Two: Finals

For the second round we are planning on a good ps and the related dataset for which is as follows: Solar Energy Production Prediction: Renewable energy sources, such as solar and wind, offer many environmental advantages over fossil fuels for electricity generation, but the energy produced by them fluctuates with changing weather conditions. Electric utility companies need accurate forecasts of energy production in order to have the right balance of renewable and fossil fuels available. Power forecasts typically are derived from numerical weather prediction models, but statistical and machine learning techniques are increasingly being used in conjunction with the numerical models to produce more accurate forecasts. The goal of this is to discover which statistical and machine learning techniques provide the best short-term predictions of solar energy production.







Simul8-R

Event Description

In the current advances in research fields there is a great need of simulation, simulation is viewed as a tool to circumvent the tedious experiments that needs to be performed with lot of capital, human resources and time. Overtime people came with mathematics to study the systems, but developing mathematical equations to a complex system takes lot of research, time and many times equations proposed are compromised by taking heavy assumptions. Simulation has a consistent success in the research area and is a mate of every researcher.

Many times, there won't be ready made software available to suit our needs and one has to build his/her own simulation software. The event strives to provide such an experience to its participants, in this event participants are expected to build a simulation model for a given system whose behaviour and related theory would be explained in detail in the workshops.

<u>Structure</u>

Problem Statement will be based on the smart grid system, here is the brief description about problem statement. There are different sources of energy namely renewable and non-renewable, located at variable positions from consumption end. Energy to consumption end is sent over the grid. The smart grid system is about adding intelligence to existing grid system, resulting in grids which are efficient in minimizing power loss or which are effective in using renewable energy by tolerating some power loss and many other such intelligent grids. The problem becomes interesting when we consider consumers equipped with some sources which produce their own renewable energy and they also become part of power distribution. Now at a given moment of time, a particular consumer has many options from which it can fetch power (from its energy deposit, others energy deposit, power stations). The simulation model developed for above system can be used to study the effectiveness of grid system and its protocols with respect to topological aspects of grids correspondingly, the location of power stations, the location of consumer ends for a random load distribution to get a vague idea about the grid before deploying it.







CODIGO

Description

Today computers can do all sorts of work and making it understand what you intend to do, in a simple concise manner, forms the essence of computer programming. Good Programming is considered to be the measured application with the goal of producing an efficient and evaluable software solution. It's the curiosity to discover new things, new algorithms, figure out the solution to a complex problem, improve the existing solution. It leads to continuous learning and improvement. This is done by the efficient programmers who scratch their minds day in and out to make computer follow their commands. For all those, Prastuti brings to you, Codigo.

<u>Structure</u>

Codigo is an online competitive programming contest conducted as part of Prastuti, the Department Fest of Electrical Engineering (IIT-BHU). It is open for all and is an individual event. It is aimed to give expert programmers an opportunity to compete, also give beginners an exposure to programming contests.

The contest duration will be of 2.5 hours. It will consist of 6/7 problems. The platform for hosting the contest will be Hacker rank. It will support over 30 languages. Problems will be sorted according to their difficulty level.







Cryptex

Description:

Who does not know about the great mathematician Allen Turing who break the impossible Enigma code during the 2nd world war? Mysteries and secrets have always intrigued the curiosity of the human mind. In the age of information today, Cryptography has grown into a very broad field to address critical issues like data accessibility and security.

Prastuti'19 presents you a thrilling journey into the world of mysteries and puzzles, having a series of rounds on ciphers, encryption-decryption algorithms, Morse code, steganography and much more. It will be amazing to see how the tactics of cryptography can be used for safe and secure digital data communication. It will be a challenge to use your coding skills, puzzle-solving aptitude and intuition to unlock the mystery "Cryptex".

<u>Structure</u>

Team: 3 Members

Workshops Required: 4

- 1) Introduction, History, Applications
- 2) Basic Ciphers, Number Theory
- 3) Advanced Encryption Standard Algorithms: DES, RSA, and DSA
- 4) Basic Steganography (Images, Video, Audio, Morse Code) and Revision

After each workshop, a puzzle will be given to solve as fast as possible and the winners will get goodies. Answers or hints of these puzzles may be used in final round problems.

Round 1:

Quiz containing Puzzles, MCQs or one-word answers. All team members have to attempt the quiz individually. The final score will be average of all team members' scores.

Round 2 (Final Round):

Theme: Electrical based 5 Written problems (may or may not require coding)







QUIZO

Description

Quizo is the quizzing event of Prastuti. It will be conducted in offline mode only. Before actual event many questions and facts will be circulated as to familiarize with it. <u>It will be based on Electrical Engineering and Science and technology relevant to us in our day to day lives.</u>

<u>Structure</u>

It will have 2 rounds namely Prelims and Finals. **Prelims:** - 15 -20 Questions (Shortlisted candidates will be allowed to appear in Finals) **Finals:** 4 Rounds (max) **Duration:** 2 Hours







Guest Lecture

<u>*Title:*</u> High resolution multilevel voltage space vector structure generation for variable speed drives and grid-tied applications

About the Lecture:

Recently, numerous interesting multilevel topologies have been reported for motor drive applications. However, to date, the most popular topology is the neutral point clamped (NPC) three-level topology. Especially for medium-voltage drives applications. This shows that the industry is still looking for viable alternative to this topology, with reduced power circuit complexity and increased reliability for medium-voltage drives applications. This specific lecture will focus on some of the recent done on five-level, nine-level inverter topologies and 17-level multilevel topologies, with reduced DC-link voltages, enabling multilevel back- to- back inverter operation for medium voltage drives. This is followed by some recent work on multilevel topologies, with stacked low voltage inverter cells, polygonal voltage space vector generation with decagonal, octa decagonal and 24-sided structures for variable speed drives applications.

About the Speaker:

Prof. K. Gopakumar received his B.E., M. Sc. (Engg.) and Ph.D. (E.E.) from the Indian Institute of Science, Bangalore. He is currently a Professor at the Department of Electronic systems Engineering (formerly CEDT- Centre for Electronics Design and Technology (CEDT), at Indian Institute of Science (IISc), Bangalore.

He is a member of the following professional bodies and also has received the following awards.

- Fellow IEEE
- Fellow IETE (India)
- Fellow Indian National academy of Engineers (FNAE)
- Co Editor-in-Chief IEEE Trans. On Industrial Electronics.
- IETE (India)- B.K Bose award for contributions to the area of power electronics and drives for high power applications
- Distinguished Lecturer-IEEE Industrial Electronics Society
- IISc Alumni award for Excellence in Research in Engineering-2016
- ABB Chair professor 2016 -2018

He has nearly 33 years of research and teaching experience with 104 international journal publications and nearly 82 international conference publications. He has guided 27 PhD students in the area of Power Electronics and Drives and another five more are currently working under him for the PhD degree. His fields of research interest are in high power converters, variable speed drives and PWM control of converters.







Workshops

Technical workshop series was also organised on Artificial Intelligence and its application in Electrical Engineering, IOT (Internet of Things), Automobile, Robotics and Embedded System. The workshops were organised by TechGyan and powered by MICROSOFT Technology Associate.