Rastreeya Shikshana Samiti Trust

R V College of Engineering

Department of Electronics and Instrumentation Engineering

8th Mile, Mysuru Road, Bengaluru-560 059

"AUTOMATION EXPLORER"

NEWSLETTER

Vol 2, Issue -2, 2016

In this Issue,

R V College of Engineering (RVCE) Established in 1963 with three engineering branches namely Civil, Mechanical and Electrical, today RVCE offers 12 Under Graduate Engineering programmes, 22 Master Degree programmes and Doctoral Studies, located 13 km from the heart of Bengaluru City - the Silicon Valley of India, on Mysuru Road Sprawling campus spread over an area of 52 acres set in sylvan surroundings provides an ideal ambience to stimulate the teaching-learning process, helping in bringing out skilled and disciplined Engineers. RVCE rated one amongst the top ten self-financing Engineering Institutions in the country. Current annual student intake for Undergraduate Programmes & Post Graduate Programmes in Engineering is in excess of 1200. Highly qualified and dedicated faculties utilize their expertise in various disciplines to conduct Research and Development for Industry and Defense establishments in the country.

Message from Editor's Desk

Welcome to this issue of Newsletter from the Department of Electronics and Instrumentation Engineering. We are delighted to launch our Bi annual NewsLetter **"AUTOMATION EXPLORER"**. This newsletter is a digital way for us to communicate with our students, faculty members, alumni and industrial partners. This newsletter will provide a glimpse of the department activities and achievements within the academic unit. Also it enlightens the readers about the latest happenings in the department, focusing about activities, placement, ISA and institutional club activities. We look forward for more activities and achievements from the department to march towards excellence in the future.

1. About the Department of Electronics and Instrumentation Engineering


Dr. K B Ramesh, HoD

The Instrumentation Technology Department was established in the year 1981 with an intake of 40 students and the current intake is 60 students. The Instrumentation Technology was later nomenclated as **"Electronics and Instrumentation Engineering"** in the year 2014. The department also runs a Post-Graduate programme in Biomedical Signal Processing and Instrumentation and an established Research Centre in 2011, affiliated to VTU Belagavi. It offers high quality research as part of its PhD programs. The department has been accredited multiple times by NBA, New Delhi, the latest being in 2013 for UG and in 2014 for PG.

The department aims to produce engineering graduates with adequate theoretical and practical knowledge in the area of electronics as well as instrumentation and computers so as to make them capable of design, implementation, development and maintenance of advanced instrumentation systems.

Instrumentation engineering is a specialized branch of electronics, computers and electrical engineering, primarily focusing on the principles and operations of measuring instruments used in the design, implementation, configuration, and development of automated systems. Electronics and instrumentation engineers carry out the task of measuring, testing, installing, designing, and maintaining various instruments used in the industry, hospital and other sectors of the society as well as carrying research in domain areas. The aim of instrumentation engineers is, "***To measure the world accurately and to control it precisely***".

The program curriculum is suitably designed to meet the challenges of global technology. The department has well qualified and experienced faculty members with research experience in allied domains and well equipped laboratories.

The implementation of outcome based education in the program enhances the knowledge of faculties and students to meet the challenges of new technological world so as to mould the graduates as successful professional engineers, researchers and entrepreneurs. The curriculum of this program is good enough for employment in industry, government, academia, research and management positions.

At the outset, I congratulate the newsletter committee members for their efforts in bringing out the newsletter. Newsletter is an amalgamation of all the events held in the department and it plays a pivotal role in showcasing the achievements accomplished by the faculty and the students.

2. *Department Vision, Mission, PEOs and PSOs.*

Vision

Achieving academic excellence in Instrumentation Technology by adopting interdisciplinary research with a focus on sustainable and inclusive technologies.

Mission

1. To create an environment for students to excel in domain areas and get motivated to involve in interdisciplinary research by utilizing state of the art infrastructure.
2. To impart technical knowledge, encourage experiential learning and develop future professional leaders.
3. To establish industry-academia networking and develop industry-ready students and future entrepreneurs, to meet societal & industrial challenges.
4. To motivate lifelong learning and research in sustainable technologies to find improved solutions for the betterment of society.

Program Educational Objectives (PEOs) of the Department

1. Apply Instrumentation, Electronics, Controls and Automation concepts to develop technical solutions for industrial problems.

2. Exhibit competency in adapting to various industrial challenges and work in inter-disciplinary projects with team spirit and professional ethics for achieving organizational goals.

3. Pursue higher education in technology or management and achieve professional excellence by imbibing leadership qualities and communication skills.

4. Become entrepreneurs with a focus on sustainable technologies and develop innovative solutions to meet industrial and societal needs.

Program Specific Outcome (PSOs) of the Department

PSO1: Design, analyze and practice the instrumentation, controls and automation concepts and techniques required for industrial and/or research pursuits resulting in product development, publications or patents.

PSO2: Demonstrate the knowledge of basic science, mathematics, electronic system design and programming for real-time applications, towards developing industrial solutions and become technology leaders of future.

3. *Departmental Activities from July 2016 to Dec 2016*

The department always endeavored to contribute significantly to the growth of technical education. The department has organized several workshops, seminars and guest lecturers for the benefit of faculty, students and research scholars of educational institutions in and around the region.

Table 1: List of activities conducted in the department

Sl.No	Event Organized	Contributory Industry/ Institution/ Faculty	Organized by Department	Date
1	Introduction to Signal processing	Dr. K.B Ramesh	E&I, E&C, EEE, TE RVCE	25/7/2016
2.	RVCE- NI LabVIEW Academy	Mrs. Rajasree P M	E&IE	20/10/2016
3.	RVCE- NI LabVIEW Academy	Mr. Joe Woodford, National Instruments from London	E&IE	20/10/ 2016
4.	Advanced Topics in LabVIEW	Mr. Manimaran A, VI Solutions, Vasanth Nagar, Bengaluru	E&IE	22/10/2016 to 24/10/2016
5.	ILAFM 2016	RVCE	E&I, E&C, EEE, TE RVCE	20/12/2016 to 22/12/2016

Gallery

Prof. Rajasree P M,(second from left) receiving a certificate and certified as CLAD engineer from Mr. Joe Woodford, NI at NI-Days held on 19 October 2016.

Dr. K N Subramanya-
Principal, RVCE,
Prof K N Raja Rao-
Advisor, RVCE &
Mr. Joe Woodford –
National Instruments
Signed a MoU to start NI-RVCE LabVIEW academy

4. RVCE- ISA activities

The Instrumentation Technology program has conducted many professional activities under lead International societies like ISA, which is a non profit professional body that sets the standard for those who apply engineering and technology to improve the management, safety, and cyber security of modern automation and control systems used across industry and critical infrastructure. ISA develops widely used global standards; certifies industry professionals; provides education and training and provides career development programs for its members. RVCE-ISA student section is active since 2000 in the department. The RVCE- ISA activity is headed by **Prof. S. Venkatesh.**

Table 2: RVCE-ISA activities conducted in the department

Sl. No	Date	Event	Resource person
1	12/9/2016	Experiential Talk	**Aritra Paul,** *former ISA President, 2012*
2	19/10/2016	Optimal and Adaptive Control Systems, Expert Lecture by Prof Krishna Mohan	**Krishna Mohan,** *Assistant Prof., Electronics and Instrumentation Department, Dayananda Sagar College of Engineering, Bengaluru*
3	27/10/2016	Investiture for newly elected office bearers	**Dr Sunil Shah**.

5. *Frequency Club activities*

"Frequency club" is one of the clubs which encourage technical creativity among the students at institutional level. The purpose of frequency club is to bring out efficient engineering graduates powered with multiple technologies and inspire young brains to develop interesting solutions for industrial, medical & societal problems. Frequency club is active since 1995 and hosted by department of Electronics and Instrumentation Engineering under the leadership of **Prof. S. Venkatesh.**

Table 3: List of activities conducted under Frequency club

Sl.No	Date	Event	Resource person
1	April-Sept 2016	R&D Projects	Automatic IOT based Sprinkler
2	Sept 2016	E Waste	**Mr. Krishna Reddy,** *Registrar, RVCE*

6. *Guest Lecturers delivered at other institutes /department by E&IE faculties*

Table 4: Guest Lecturers by faculty of E&IE department.

Sl.No	Date	Event	Resource person
1.	8/7/2016	One Week workshop on Bio sensors at Dept. of BT, RVCE	Prof. S.Venkatesh Mr. Harsha Mr.Sandesh. R S
2	13/07/2016 to 14/07/2016	ICT for Teaching Staff, National Institute of Engineering	Mr. Kendaganna Swamy
3	15/07/2016	Training on Innovating Teaching, SJCE, Mysuru.	Mr. Kendaganna Swamy
4	28/07/2016	Pedagogy Training for Teaching Staff, RVCE, Bengaluru.	Mr. Kendaganna Swamy
5	29/07/2016	Bio-Sensor Seminar, MSRIT, Bengaluru.	Dr. Anand Jatti
6	19/8/2016 to 20/8/ 2016	Design and Developing flipped classroom, e-Learning Instruction for Engineering and Science Education, Jawaharlal Nehru National College of Engineering (JNNCE).	Mr. Kendaganna Swamy
7	17/11/ 2016	"Brain Computer Interface –Challenge, application and Research Problems", DBT sponsored Guest Lecture at Annamalai University, Chidambaram, Tamil Nadu.	Mr. Sandesh R S

7. Student Activities.

Table 5: Student activities from Jan 2016 to June 2016

Sl.No	Event	Student name	Awards won	Venue
1.	Inter Collegiate Zonal Tournament Basketball	Ashish B Nair	1st Prize	GAT, Bengaluru
2.	Inter Collegiate Zonal Tournament Basketball	Ashish B Nair	3rd Prize	NMIT, Bengaluru
3.	11th Dr. M S Ramaiah Memorial State Level inter engineering colleges	Ashish B Nair	3rd Prize	MSRIT, Bengaluru
4.	Inter Collegiate basketball tournament (MOMENTUM)	Ashish B Nair	2nd prize	RVCE, Bengaluru
5.	Inter Collegiate basketball tournament (MOMENTUM)	Ashish B Nair	3rd Prize	RVCE, Bengaluru
6.	VTU inter collegiate Bengaluru South zone hockey tournament.	Akash Biradar	2nd prize	GAT, Bengaluru
7.	VTU inter collegiate Bengaluru South zone hockey tournament.	Akash Biradar	Participated	BLDEASCET Bijapur
8.	Athletics VTU inter collegiate athletics	Akash Biradar	Participated	Dr. TTIT, KGF
9.	Inter Department Kabaddi Event	Jayraj D C Anjaneya T Manjunatha A Mehlam B Ashfaq Ahmed Akash V Hugar Rohith Mahesh Kiran kumar C Yamanappa B Manoj kale G Bharath Reddy	1st Prize	RVCE, Bengaluru
10.	Inter department Throw ball	Ganavi, Thrishala, Keren Thomas, Sahana H G, Manisha M , Vidya, Sahiti B M, Akshara, Neeraksha	1st Prize	RVCE, Bengaluru

8. Publications details of faculty/students.

1. Vidya M J, Dr. Padmaja K V, Chaithra G, "An Indigenous PPG Acquisition System Using Monolithic Photo-detector OPT101", *International conference on Signal Processing, Communication, Power and Embedded System*, Centurion University, October 03-05, 2016, in Paralakhemundi, Odisha.
2. Vidya M J,Dr. Padmaja K V, "Computation of Image Compression Using Haar Wavelet Transform to Reduce Redundancy at different levels", *International Journal of Advanced research in computer and communication engineering (IJARCCE)*, Vol. 5, Issue 9, September 2016.
3. Mrs. Rajini Katiyar, Dr. Padmaja K V, "Performance of Zero forcing pre codes for vectored DSL" *IOSE Journal of electronics and Communication Engineering*, e-ISSN:2278-2834 , Volume No.11, Issue-4, PP-64-68, Aug-2016.
4. Mr. Harsha, Dr. Padmaja K V, "SVM Based Classifier for Noise Classification in Ultrasound B- mode Image", *International Journal of Engineering Research and Technology"*, Vol. 5 - Issue 08, August 2016.
5. Mrs. Veena Divya K, Dr. Anand Jatti, "Image processing and parameter extraction of digital panoramic dental X-rays with ImageJ*", International Conference on Computation System and Information Technology for Sustainable Solutions (CSITSS)*,6th-8th October, 2016, RVCE, Bengaluru, Electronic ISBN: 978-1-5090-1022-6.
6. Mrs. Veena Divya K, Dr. Anand Jatti, "Appending Active Contour Model on Digital Panoramic Dental X-rays images for Segmentation of Maxillofacial Region", *IEEE-EMBS Conference on Biomedical Engineering and Sciences*, Kaula Lampur, Malaysia, 4^{th} -8^{th} December 2016.
7. Mrs. Rajasree P M, Dr. Anand Jatti, "Review on various diagnostic techniques for detection of breast cancer", *Second International Conference on Large Area Flexible Microelectronics (ILAFM 2016)*, 21^{st} -23^{rd} Dec, 2016.
8. Mrs. Rajasree P M, et.al, "Hybrid segmentation &performance analysis of mammographic images", *International Research Journal of Engineering &Technology*, volume 3,Issue 8 August 2016.
9. Mrs. Rajasree P M,et.al, "Microscopic image analysis for detection of breast cancer", *International Research Journal of Engineering &Technology*, volume 3,Issue 8 August 2016.

9. Industrial Visits.

The Department has common practice to arrange Industrial visits atleast once in a semester to give exposure to in the field of Automation, Electronics and Instrumentation.

Industrial Visit to Vijay Rotogravures on 22/08/2016. The students were exposed to automation in Automobile industry. Prof. Vidya M J, Prof. Veena Divya K and Prof. Sandesh R S were the coordinators

Industrial Visit to Toyoto Kirloskar motors Pvt. Ltd on 10/11/2016. The students were exposed to automation in Automobile industry. Prof. Harsha H and Prof. Sandesh R S co-ordinated the industrial visit.

10.Placement Details:

As on 31st December 2016, 63 students of 2016 batch of department of Electronics and Instrumentation Engineering have been placed in various companies like Accenture, Cognizant, Infosys, Wipro and TCS. The percentage of placement is 92.06% of B.E Students of which 4 students went to overseas for higher studies (Table 6). The placement activities for 2016-17 batch were started in the month of July 2016 of which 37 students have been placed and the process is still ongoing. The placement activities are co-ordinated by **Prof. Kendaganna Swamy.**

Table 6: Placement Statistics for 2015 and 2016(on-going) batch

	2015-16	**2016-17**
Total Number of students	68	61
Number of students eligible	63	58
Number of students placed.	58	37(on-going)
Placement %	92.06	63.79
Higher studies	4	--

11.MoU with department of E&I Engineering.

The Department of Electronics and Instrumentation Engineering has signed an MoU with LI2 innovations on 27-10-2016, which was co-ordinated by Prof. S Venkatesh and Shreesha B Kurdi of 7th SEM E&IE.

Microwaves for Detection of Breast Cancer

Breast cancer, a global disease largely considered as urban women's bane is projecting its occurrence as the first and the most common cancer among urban women in India and second among rural women in India. Its incidence has been rising due to i) Age shift in the occurrence from the age group of 40-50 to 30-40 and ii) Lack of awareness and mass screening tools. The survival rate is directly related to the stage at diagnosis. Earlier the diagnosis , better the survival rate

*A disobedient mass of cells - loosely called a cancer, or tumour - sits in the midst of healthy tissue. Evading the body's immune system, and drawing sustenance from the blood vessels that it manages to recruit around itself, the rogue mass continues to grow - as cells within it divide, and divide again. As it works hard at performing this deadly exercise, the tumour cannot help but warm up and give off some heat. This heat radiates outwards and is ordinarily lost to surrounding spaces.**

The greatest impediment to our efforts to prevent, detect and fight cancer has been the inconvenient fact that cancerous cells are the body's own cells, now gone wild. When a microbial cell (a bacterium or a fungus) infects a human body, we manage to attack it with chemicals, such as antibiotics, which take advantage of the bacterium's vulnerabilities; vulnerabilities that are not shared by our own cells. In contrast, a cancerous cell is like a healthy cell in almost every way, except that it somehow manages to divide uninhibitedly. A cancer generally does not announce its arrival in a hurry, and it cannot be made to leave without a sacrifice of some of the body's healthy tissue

Current radiation-based methods for detecting and destroying tumors tend to themselves be potentially carcinogenic, because they use harsh and ionizing radiation. Microwaves, on the other hand, are much less harmful. Their use for imaging and therapy could change the way medical science deals with breast cancer. Today, the most reliable method of detecting breast cancer is X-ray mammography; a technique which involves sending high-energy radiation through breast tissue. X-rays have enough energy to damage DNA, and create mutations. X-rays, therefore, can actually potentially cause cancer even as they are used to detect its presence. Thus, there is a dire need for alternative imaging methods. Microwave Radiometer merely receives and measures the radiation generated by the object, making it completely safe for use with tissues. When used for cancer detection, the radiometer simply detects the heat that a tumour generates at microwave frequencies, and uses this information to find the tumour. The heat radiated by a tumour, and by healthy parts of the breast, carries information about temperatures. This allows a radiometer-based device to create a three-dimensional temperature map of the breast.

Going inwards, as the temperature rises, one encounter a series of isothermal (equal temperature) contours centered around a hotspot – the cancerous mass. How well the device is able to locate a tumour depends on its ability to measure differences in temperature. In the initial stages of cancerous growth, which is when a tumour emits the most heat, it is just about a fifth of a degree (Centigrade) hotter than the normal temperature of the surrounding tissue. The tumor's size at this stage is roughly five to ten millimeters across – making it large enough to be resolved from surrounding tissue through the use of micrometer wavelengths.

Rachana S Akki
(Ph.D), IIT-M
Asst. Prof, Dept.E&IE,RVCE

The Machine Talks Back: Sensory Feedback from Brain-Controlled Prosthetic Limbs

Since the early seventies, scientists have been developing brain-machine interfaces; the main application being the use of neural prosthesis in paralyzed patients or amputees. A prosthetic limb directly controlled by brain activity can partially recover the lost motor function. This is achieved by decoding neuronal activity recorded with electrodes and translating it into robotic movements. Such systems however have limited precision due to the absence of sensory feedback from the artificial limb. The question here is, whether it was possible to transmit this missing sensation back to the brain by stimulating neural activity in the cortex. This discovery was not only possible to create an artificial sensation of neuroprostethic movements, but that the underlying learning process occurs very rapidly.

Motor function is at the heart of all behavior and allows us to interact with the world. Therefore, replacing a lost limb with a robotic prosthesis is the subject of much research, yet successful outcomes are rare. Why is that? Until this moment, brain-machine interfaces are operated by relying largely on visual perception: the robotic arm is controlled by looking at it. The direct flow of information between the brain and the machine remains thus unidirectional. However, movement perception is not only based on vision but mostly on proprioception, the sensation of where the limb is located in space.

In contrast to invasive approaches using electrodes, optical techniques for imaging and stimulating brain activity can be used. Using a method called two-photon microscopy, we can routinely measure the activity of hundreds of neurons with single cell resolution. This experiment was carried out with mice, so that it could learn to control a neural prosthesis by relying uniquely on an artificial sensory feedback signal. The principle of operation is to image neural activity in the motor cortex, when the mouse activated a specific neuron, the one chosen for neuroprostethic control, we should simultaneously apply stimulation proportional to this activity to the sensory cortex using blue light. Indeed, neurons of the sensory cortex were rendered photosensitive to this light, allowing them to be activated by a series of optical flashes and thus integrate the artificial sensory feedback signal. The mouse was rewarded upon every above-threshold activation, and 20 minutes later, once the association learned, the rodent was able to more frequently generate the correct neuronal activity.

This means that the artificial sensation was not only perceived, but that it was successfully integrated as a feedback of the prosthetic movement. In this manner, the brain-machine interface functions bi directionally. The researchers think that the reason why this fabricated sensation is so rapidly assimilated is because it most likely taps into very basic brain functions. Feeling the position of our limbs occurs automatically, without much thought and probably reflects fundamental neural circuit mechanisms. This type of bidirectional interface might allow in the future more precisely displacing robotic arms, feeling touched objects or perceiving the necessary force to grasp them.

Courtesy: Daniel Huber, University of Geneva

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