

INDIAN INSTITUTE OF TECHNOLOGY, PATNA

DEPARTMENT OF ELECTRICAL ENGINEERING

**PLACEMENT BROCHURE
2019-2020**

Message from HOD

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The Department of Electrical Engineering at IIT Patna offers undergraduate programs that emphasize the fundamentals of electrical engineering and electronics technology to cater the needs of the world. Undergraduate curricula are offered that lead to Bachelor of Technology (B. Tech) degrees in electrical engineering. Department offers many advanced courses and have Master of Technology (MTech) in Communication System Engineering and the Doctor of Philosophy (Ph.D) in Electrical Engineering.

All faculty members are very renowned in their respective field of research and hold doctorates from reputed universities. Department has a Centre of Excellence in Teaching Learning Centre for Internet-of-Things (IoT), Smart Grid, and Smart Building sponsored by Department of Higher Education, Ministry of Human Resource Development (MHRD), Government of India. This centre has brought the department international recognition and provides unique opportunities for electrical engineering graduates and teachers of India to participate in learning the IoT related projects.

Students of the Department of Electrical Engineering are known throughout India for their enthusiastic participation in professional organisations and events. We regularly revise our curriculum according to the need of today's research and industry applications. The primary focus of our curriculum is to convey technical know-how to students, promote their problem solving skills and innovation of new technologies. We carry out collaborative and interdisciplinary research in various industries and research centres worldwide.

We have modern research and laboratory facility in the department. Our faculties have been conferred with many prestigious awards at national and international levels. We organise international symposia and conferences in the department. Our department looks forward to contribute in solving the technological challenges of the rural India with active participation from all sections of the society. The department takes pride in producing well rounded, professionally competent undergraduates and graduates.

DR. AHMAD ALI

HOD, ELECTRICAL ENGINEERING



COURSES OFFERED

About the department

Since the inception of the institution in 2008, the Department of Electrical engineering has been at the forefront of research and innovation, working on its primary objective of imparting quality education and training whilst leading on the innovation curve.

The department offers a comprehensive array of courses that encompass the undergraduate, postgraduate and doctoral levels. The department's reputed faculty brings their expertise to bear on a wide variety of areas in electronics and communication engineering, with emphasis on Communications, Advanced Digital Signal Processing, Biomedical and Speech Processing, Instrumentation and Control, VLSI, Image Processing and Computer Vision, Power System and Power Electronics. Laboratories for Basic Electronics, Analog Electronics and Digital Electronics, Communications, Digital Signal Processing, Embedded Systems, VLSI, Electrical Machines, Power Electronics and Power Systems are fully operational with advanced technologies, hardware equipments and necessary softwares. The Department has online access to IEEE Explore digital library, IEL, Science Direct, Springer and other online journals. High End Computational Servers and Software's like MATLAB, GAMS, CAD Tools and LabVIEW are available with the Department in order to accelerate the research. Department has a number of ongoing and approved projects worth 55 crore rupees under its umbrella.

The Electrical Engineering Department undertakes a continuous process of setting up experimental and computational facilities for taking up research & development and consultancy activities in various fields as also to produce state-of-the-art research output. In its brief but illustrious history, the EE Department of IIT Patna has already earned global recognition by its cutting edge R&D work. Research is nurtured both through academic programs run by the Department and through sponsored programs funded by national as well as international organizations and the industry.

SIGNAL PROCESSING

Signal and Systems forms one of the core areas at Electrical Department of IIT Patna. Faculty and students at IIT Patna are involved in various sponsored and non-sponsored interdisciplinary projects in domains such as circuit design, communication, seismology, biomedical engineering, energy generation and distribution, speech processing etc.

Courses Offered:

- Signal, System and Networks
- Digital signal processing
- Advanced digital signal processing
- Visual surveillance systems
- Advance Biomedical Signal Processing

Laboratories:

- Digital Signal Processing Laboratory

Sponsored Projects:

- Geospatial Location Estimation and Navigation in Autonomous Sensor Networks/Smart City
- Cyber-Physical Systems for M-Health

POWER SYSTEMS AND POWER ELECTRONICS

Power System and Power Electronics is one of the oldest division that is functional since the inception of the Electrical Engineering at IIT Patna. Students and Faculties are involved in various funded projects and coursework.

Courses Offered:

- Electrical Machines
- Power Systems
- Power Electronics and Drives
- Electrical Power System Operation and Control
- Distributed Energy Resources
- Electrical Machines Laboratory

Laboratory Facilities:

- Electrical Machines Laboratory
- Advanced Electrical Lab

Equipments:

- WIRELESS POWER TRANSFER: A Next Generation Power Transmission System
- Transmission line Simulator
- Fuel cell training system

CONTROL SYSTEMS

Control Systems is an important part of the Electrical Department. This field is aimed at imparting best education to students, which leads to cutting-edge research. There are motivated professors and students involved in this field working in areas like control of power system, control of relay-based networks, etc.

Courses Offered:

- Control systems
- Advanced control systems
- Electrical power system operation and control

Projects:

Descriptor System: Modeling and Control in Infinite Dimension Space

Laboratories:

Instrumentation and Control Laboratory

COMMUNICATION ENGINEERING

Communication being a specialized branch involves teaching, research, and consultancy works. At IIT Patna, both faculty and graduate and undergraduate students are engaged in fundamental and applied research projects in Communication. These are being sponsored by various agencies like DST, MeitY, etc.

Courses Offered:

- Principal of communication
- Electromagnetic theory
- Communication system
- Optical Communication
- Wireless Communication

Sponsored Projects:

- Design of Blind Modulation Classification for MIMO-OFDM and MIMO-SC-FDMA System through FPGA Module and Testbed Implementation
- Design and Analysis of High Performance RF MEMS-based Electronically Reconfigurable Filters for Wireless Communication Applications
- Blind Symbol Timing Offset (STO) and Carrier Frequency Offset (CFO) Estimation and Implementation over OFDM, and MIMO-SC-FDMA testbed

VLSI & EMBEDDED DEVICES

Department of Electrical Engineering at IIT Patna is committed to provide high quality research and excellence in teaching. The faculty and students undertake various research work and projects in all areas of VLSI Design & Embedded Systems.

Courses Offered:

- Semiconductor devices and circuits
- Analog integrated circuits
- Digital circuits and microprocessors
- Introduction to VLSI design
- Embedded systems
- Electronics and instrumentation
- Radio frequency integrated circuits
- Digital VLSI Design
- CMOS Modelling

Laboratories:

VLSI Design Laboratory
Embedded Systems Laboratory

Sponsored Projects:

- Design and FPGA prototyping of multicarrier multiple access schemes for variable rate multimedia satellite communication
- Design and Implementation of Novel VLSI Architectures of PRNG for Cryptography Applications
- Design and Implementation of Novel VLSI Architectures of PRNG for Cryptography Applications

HSS AND OPEN ELECTIVES

Besides core courses, students are also offered many electives courses which ultimately helps in their allround development.

HSS Courses:

Communication Skills for Engineers, Introductory Microeconomics, Fundamentals of Linguistics Science, Introductory Sociology, Globalization and Social Change, Introductory Macroeconomics, Literature: Voices and Cultures, Language, Human Mind and Indian Society, Cognition language and computation, , Health Care Management, Financial Economics, Diasporic Literature, Sociology of Development, Fundamentals of Cognitive Science, Industrial and Organizational Psychology

Open Electives:

- Optics & Lasers, Vacuum Science and Techniques, Introduction to Nanomaterials, Solid State Devices, Photovoltaic's & Fuel Cell Technology, Green Chemistry and Technology, Introduction to Computational Topology, Entrepreneurship, Industrial Waste Treatment and Management



Developer Student Clubs
Indian Institute of Technology Patna

Developer Student Clubs

Students from our department also actively participate in **Student Developer Community powered by Google** and are involved in various projects and conducting workshops

IEEE Student Branch



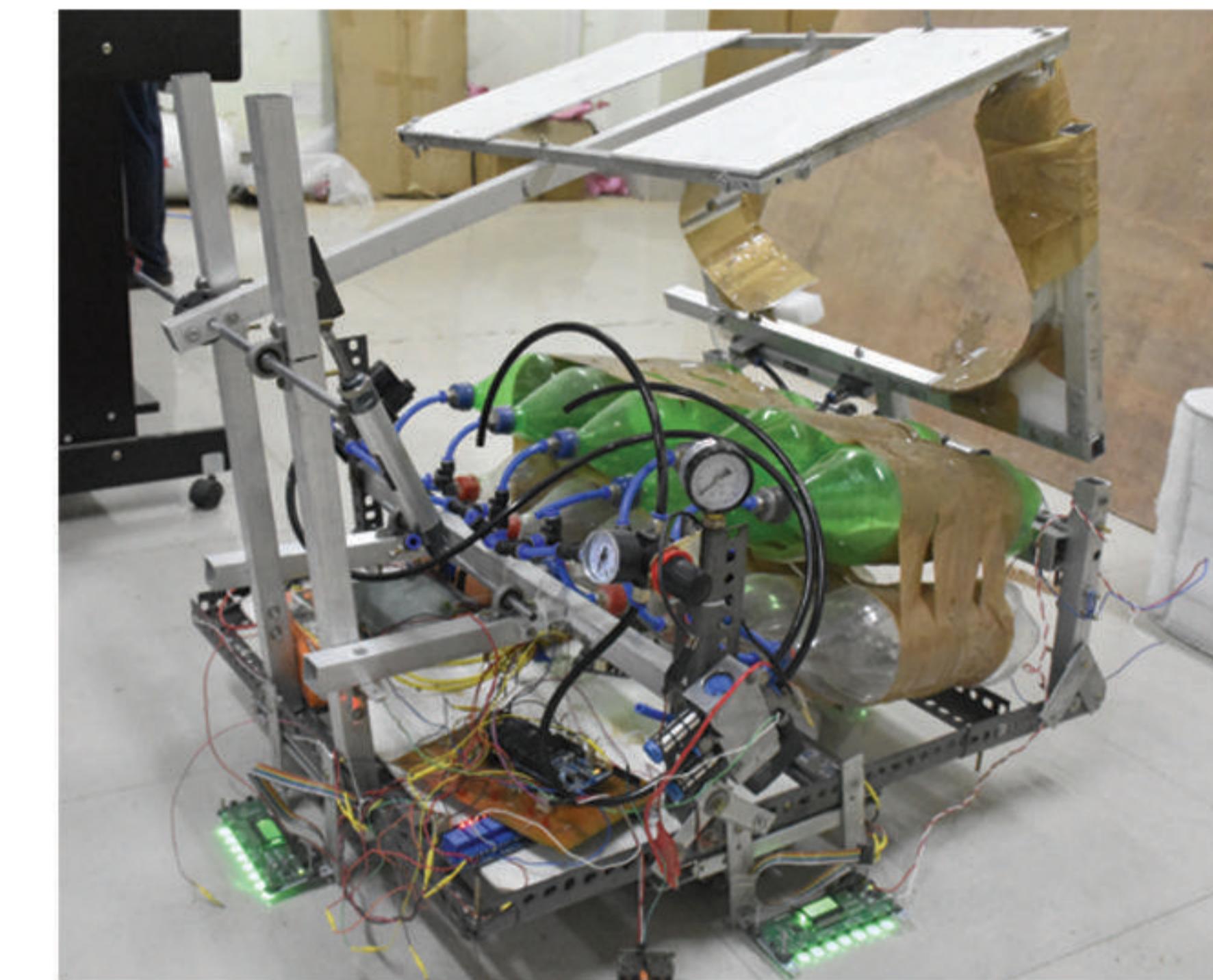
IEEE Student Branch of IIT Patna was established to develop and promote professional identity in IEEE's designated fields of interests: Sciences, Technology, Engineering and Mathematics (**STEM**) in IIT Patna. As a part of it, workshops, seminars and other events are conducted regularly to make students aware of technical achievements in the fields of STEM and encourage them to pursue a career in those fields.

STUDENT ACTIVITIES

Technical

DD India Robocon

In DD India Robocon 2019 robocon team of IIT Patna, having majority members from Electrical Department, came **2nd** in Stage 1 among all the participating institutes and, came **24th** in Stage 2



Competitive Coding



Electrical branch has a large number of competitive coders. One of them also **represented IIT Patna at ACM-ICPC world finals** along with his team in 2018 and 2019. They finished **54th** in the world finals ranking in 2018.

Inter IIT Tech Meet

Many students take part in the Inter IIT Tech meet which is held each year and showcase their talent ranging from efficient circuit design to deploying innovative machine learning algorithms.



Club Activities

Sparkonics is an association of the students motivated to learn, create and teach the basics of electronics, explore the upcoming technology and implement them through mini projects. The club also conducts events, classes and meetings for the department. With the guidance and help of the professors of the department, the club provides students a platform and resources to gain practical



Entrepreneurial



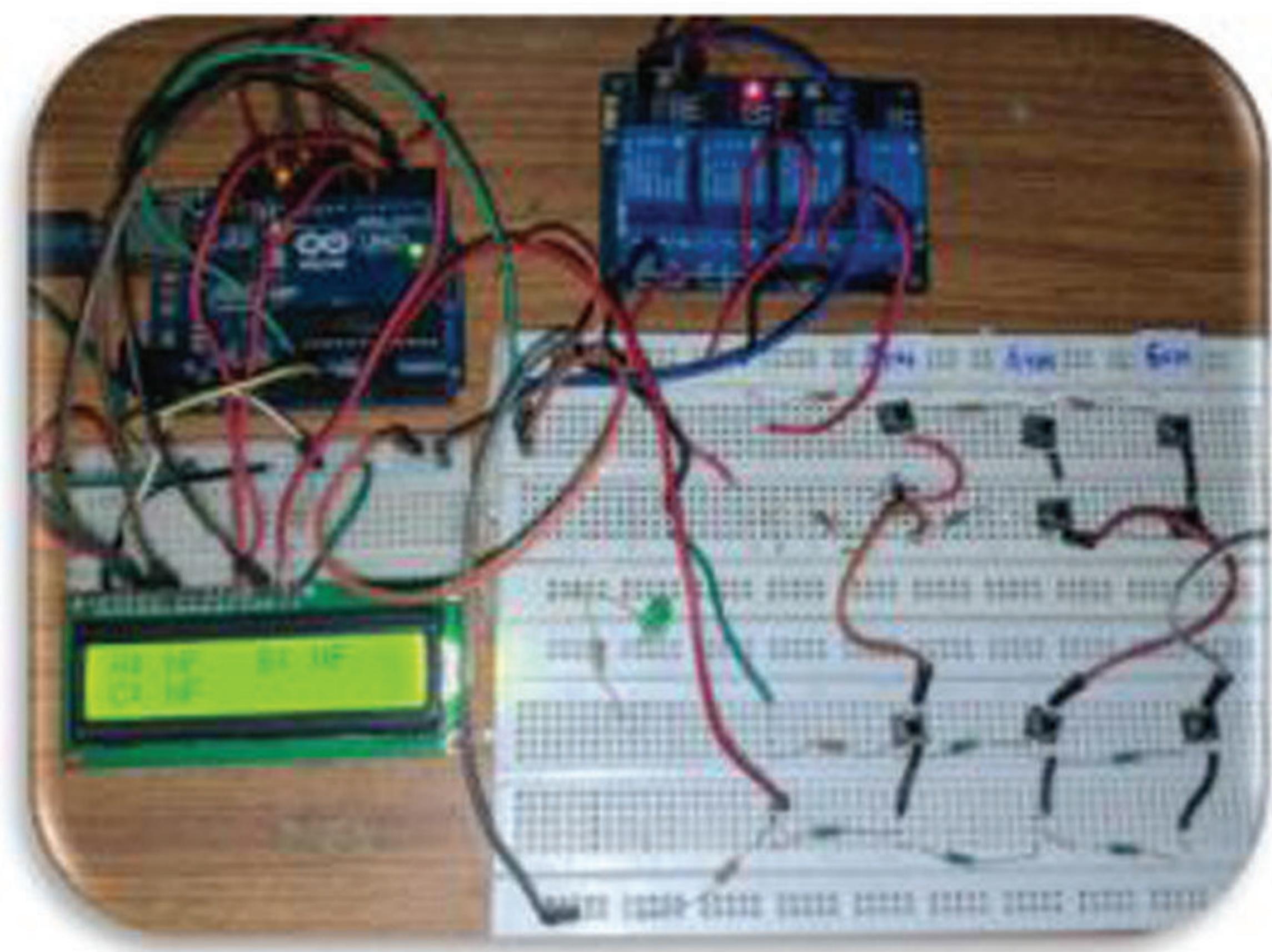
Students from our department are involved in organizing various workshops and in competitions held by the E-cell IIT Patna. One startup has been incubated and one is in pre-incubation phase.

Social

Under the name of Prayatna, students of IIT Patna try to give continuous **quality education to underprivileged children**. The Core team, which looks after the administration part, consists of 3 electrical undergraduate students.

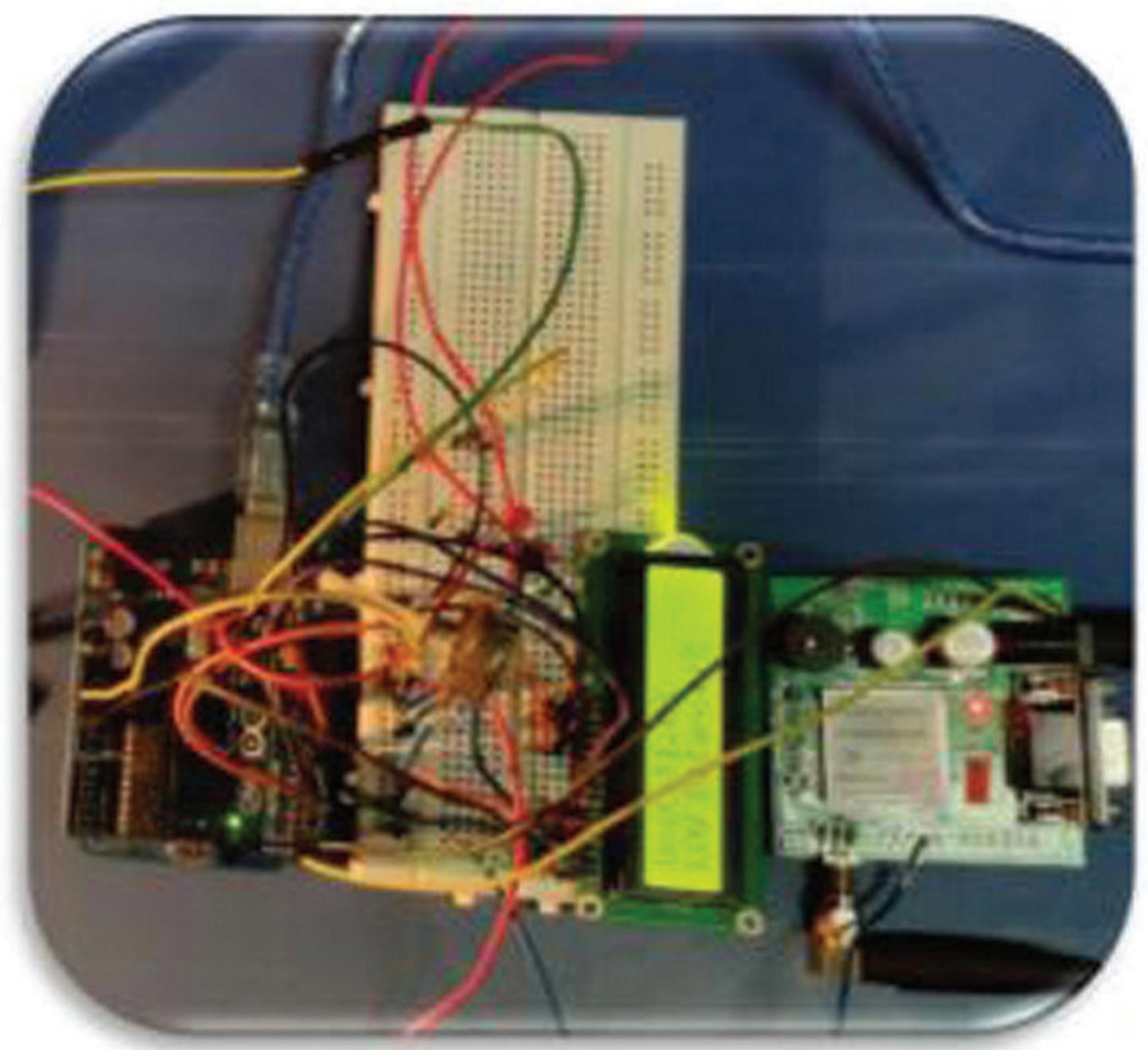


Student Projects



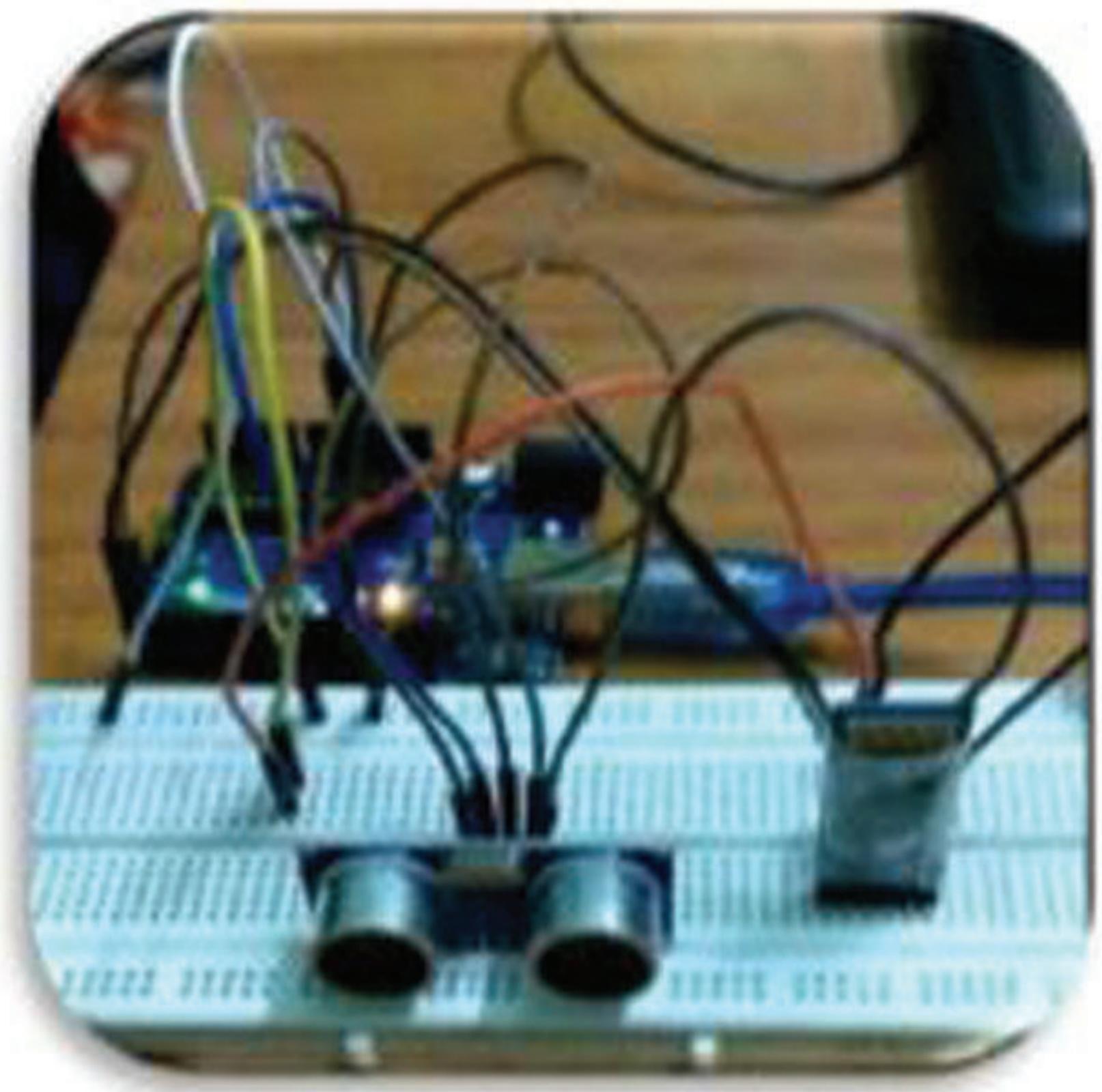
Underground Fault Detection System

It is an Arduino based model to detect the faults in the underground cables using the principle of Ohm's law. The Arduino detects the change in value of the current where the fault occurs and calculates the distance of the fault which is displayed in the LCD.



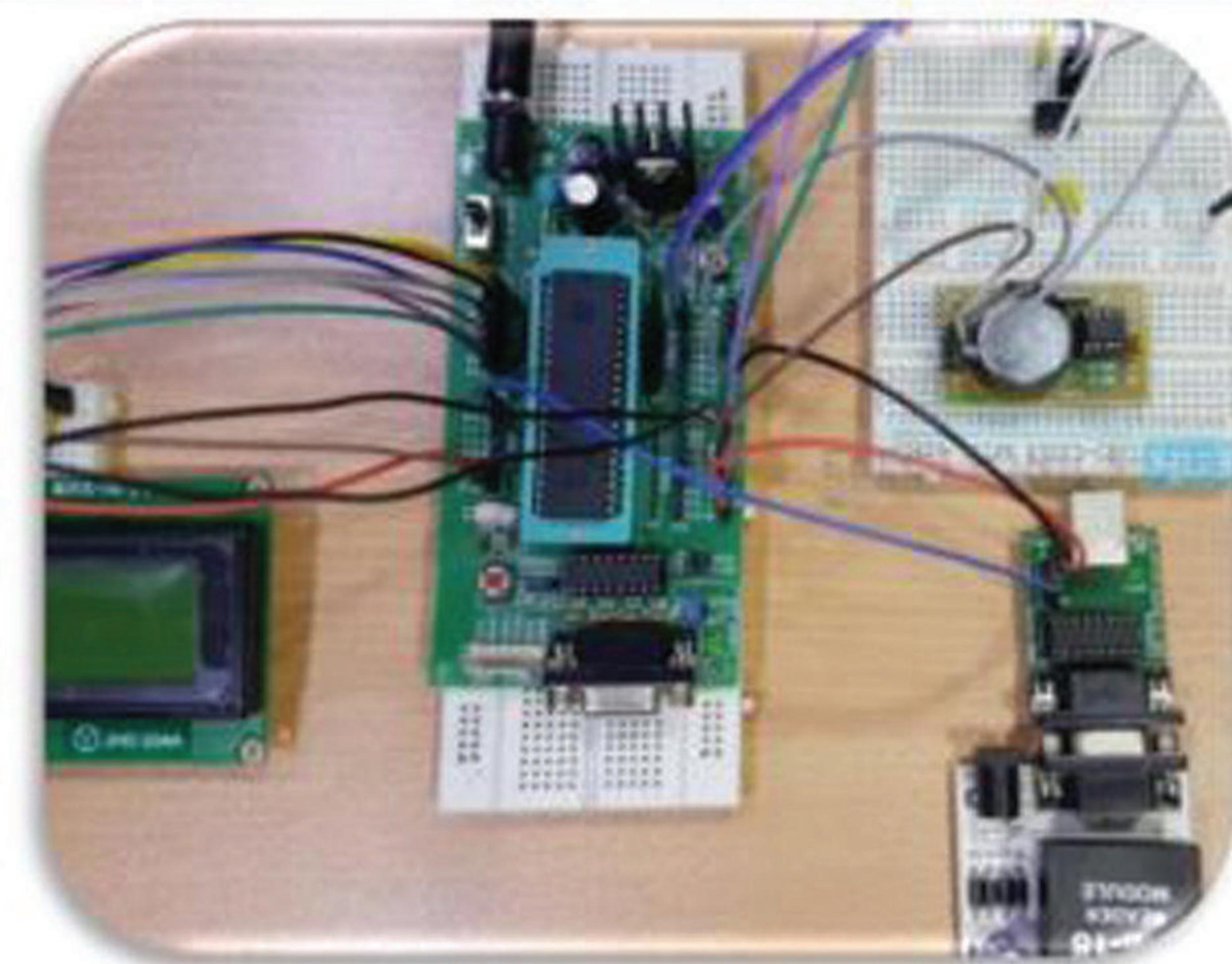
Prepaid Electricity Billing System

The device measures the electric energy consumed using an energy meter chip. It alerts the user to recharge when the units of electricity reaches to its minimum value through the GSM technology and also cuts the power supply if not recharged accordingly. This device is used for the efficient energy management and its conservation.



Waste Segregation System

The device gives the unencumbered depth and the wetness of the garbage in a bin using an **Arduino** and a **Wetness sensor** and an **Ultrasound sensor**.



Smart Parking System

The system proposes an opportunistic signal base Car parking System that can locate the empty car parking slots. The system enables the drivers to receive information regarding the availability of car parking spaces. Some of the major advantages of smart parking system are real-time intelligent monitoring and management of the parking space, reducing the traffic congestion and reduces the manual labor and energy consumption of the drivers.



FFT Processor

Area efficient and low power design and implementation of Pipelined ROM less radix-2 1024-point FFT/IFFT Processor



RISC-V

Development of a fully synthesizable 32-bit processor based on the open source PROCESSOR and its FPGA PROTOTYPE RISC-V (RV32I-M) ISA

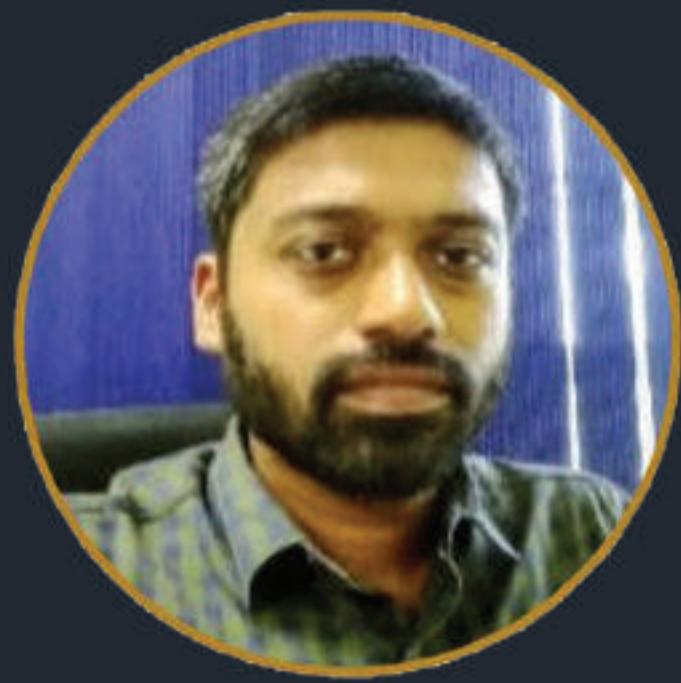
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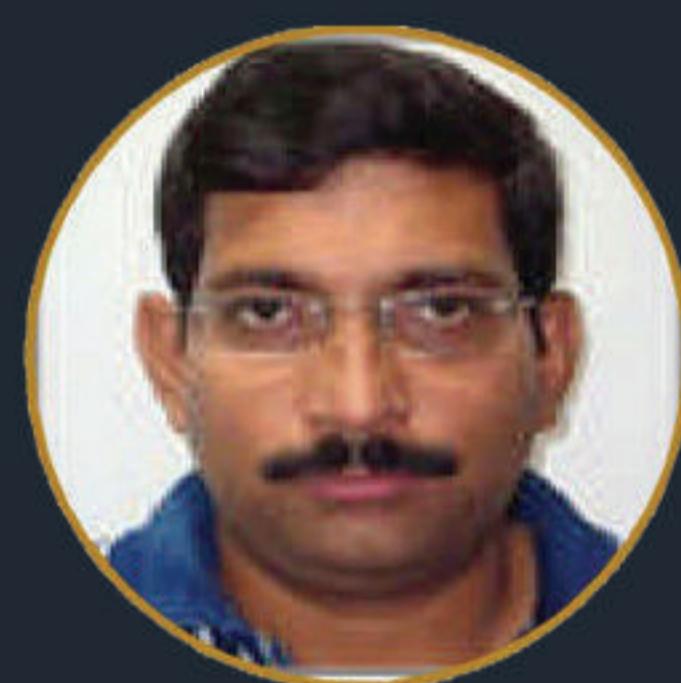
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