E-YANTRA

Electronics & Telecommunication Engineering Departmental Newsletter

Inside this issue

OBJECTIVE

Project hosted by **IIT Bombay** to spread education in **Embedded systems and Robotics** in colleges across India and sponsored by MHRD through NMEICT.

e-YANTRA TEAM

Dr. Varsha Turkar- took the initiative in setting up the Lab.

- Prof. Flavia Leitao (Team Leader)
- Prof. Yeshudas Muttu (Team Member)
- Prof. Mathilda Colaco (Team Member)
- Prof. Deron Rodrigues (Team Member)

e-Yantra Task Based Training for Lab Set-up

e-Yantra is a project hosted by IIT Bombay (IITB) to spread education in Embedded systems and Robotics in colleges across India and sponsored by MHRD through NMEICT.

DBCE was a local centre for a 2-Dayworkshop, organized by IITB e-Yantra team on "Introduction to Robotics" for training around 60 teachers from various colleges across India, on the 11th and 12th of January 2019.After the completion of the workshop, DBCE signed a "Letter of Consent" to set up a Robotics lab in the institute, which was an initiative taken by Dr. Varsha Turkar, Professor and HOD of ETC department.

A team of four faculty members: Prof. Flavia Leitao (Team Leader), Prof. Yeshudas Muttu, Prof. Mathilda Colaco & Prof. Deron Rodrigues (Team members) from the Electronics & Telecommunication department of DBCE, were chosen to be the e-Yantra team of DBCE.

The e-Yantra, DBCE team underwent rigorous Task based Training (TBT), over a period of three/four months from Jan-April 2019, conducted by e-Yantra IIT Bombay (IITB), and sponsored by MHRD through NMEICT.

Out of the 70 plus colleges that participated for the TBT, only 17 teams completed the Task Based Training within the target date, and DBCE, e-Yantra faculty member steam topped the list with a **Class A Award** securing 98.89%.

e-Yantra Challenge

After successfully completing the task based training, the e-yantra team was selected to work on yet another challenge.

The **challenge** was to:

Make an autonomous robot that performs the following tasks:

- The robot starts from the IN position of the arena representing an urban terrace farm (Refer to Figure 1). The farm consists of ten Cultivation Slots numbered 1-10. ☐ A plant is represented in the arena by a block. Each plant can have any one of the following growth status – Overgrown (O), Healthy (H) or Stunted (S). The different growth status of a plant is depicted by the height and color of the block as shown below:
- Each Cultivation Slot may or may not have a plant in it. If the Cultivation Slot does not have a plant in it, it is referred to as Vacant (V)
- Three Light Emitting Diodes (LEDs), each of a different color, Red, Green, and Blue are used to indicate the growth status of the plants. Instead of separate colored LEDs, teams are free to use a RGB LED having all the three colors. Size of LED should be 5mm. Figure 2 shows the picture of a LED.
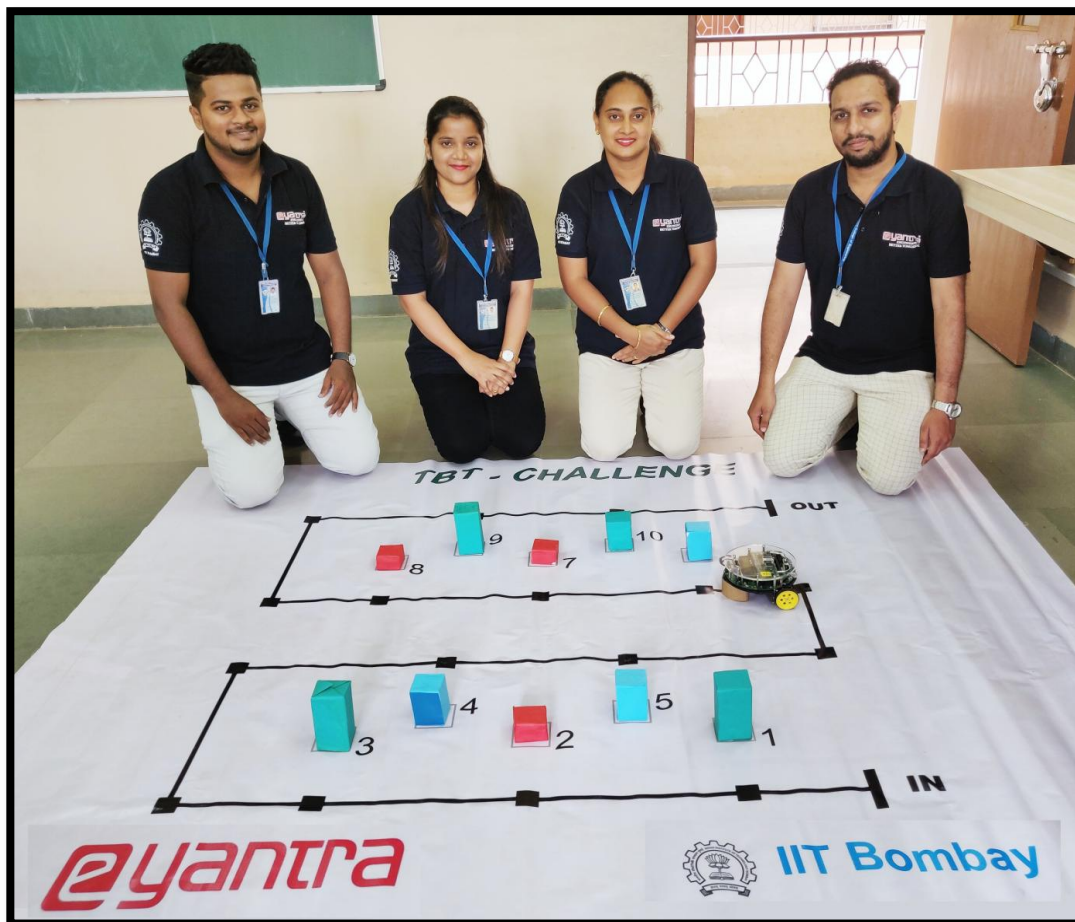
Workshop on "FIREBIRD ROBOT"

The e-Yantra Robotics Team of Electronics & Telecommunication Department of DBCE organized a Three-Day Workshop on Firebird Robot for the students of TE and BE ETC, on the 25th, 26th & 28th of June 2019.

The purpose of the Workshop was to spread education in Embedded systems and Robotics. The Workshop would also ensure better Final year projects in this area.

The students were divided into 7 teams with 4 members to work on the Firebird V Robot. The different topics covered were interfacing the Firebird Robot with the Buzzer, Boot Switch, Bar-Graph LED, LCD, Motors, IR sensors, Sharp sensors, White Line sensors and their related applications.

Day 1: 25th June 2019

The first session was taken up by Prof. Yeshudas Muttu on Introduction to Robotics that included Major Components such as Sensors, Actuators, Control system, Intelligence, Power supply, Communication, Indicating Devices of a Robot and Introduction to Firebird V ATmega 2560.
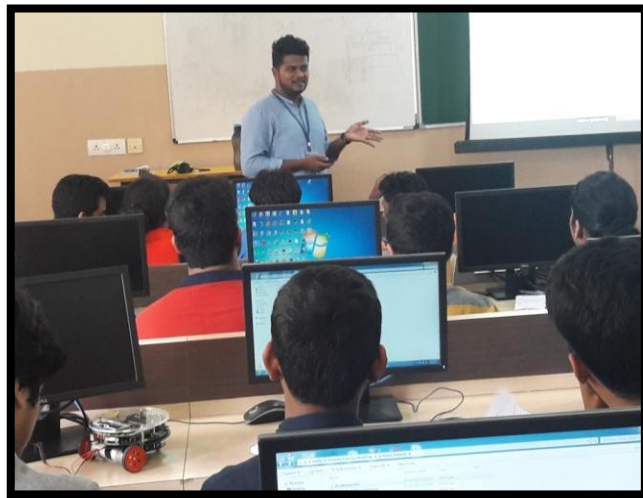
The second session by Prof. Yeshudas Muttu introduced the various Input-Output Ports and Registers in ATmega 2560 and how they can be accessed.

Subsequently, the students were given hands-on exposure in Embedded C programming for interfacing the Buzzer, Boot Switch and Bar-graph LED using the Atmel-6 Studio.

In last session for the day was taken up by Prof. Flavia Leitao on interfacing the LCD with the Firebird V Robot. The Students were briefed on the LCD operation and were then asked to interface the LCD and the Boot Switch for a given application.
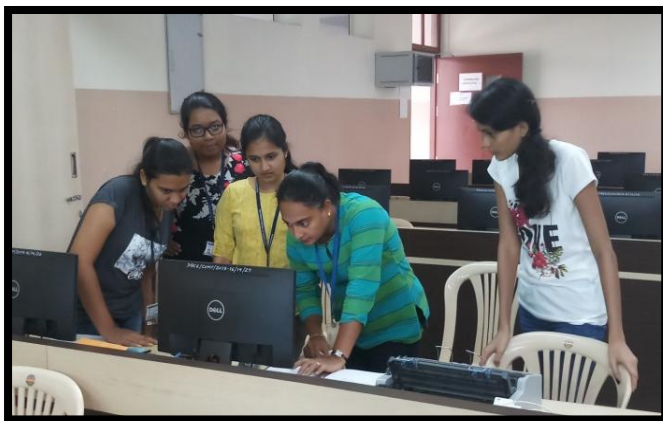

Day 2: 26th June 2019

The First session by Prof. Flavia Leitao was on interfacing the Motors. The students were briefed on the Motor Driver IC L293D and the different Motions and were then given a small task of how to interface the Motors and device an application to make the Robot move in a defined direction.

The second session was taken up by Prof. Deron Rodrigues on Counters and Timers for calculating time delays. Subsequently Pulse Width Modulation (PWM) was introduced followed by hands-on program to control the Velocity of the Motors.

The last session by Prof. Deron Rodrigues was on Analog sensor interfacing using Analog to Digital conversion. The session included overview on the sensors like Sharp IR sensors, Proxity Sensor, etc, interfaced to the different channels of ATmega2560 followed by Programming.

Day 3: 28th June 2019
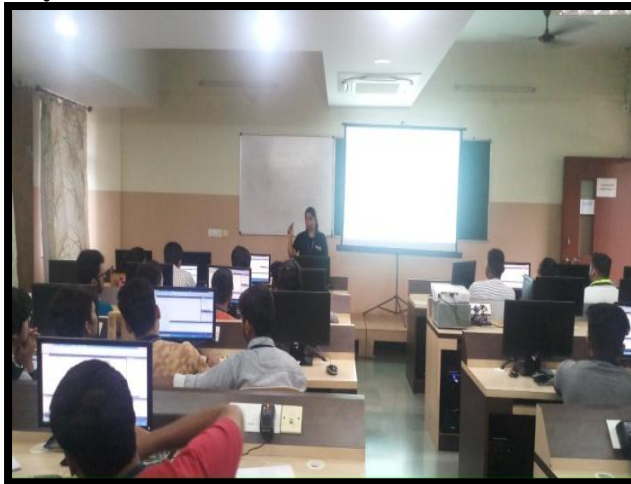
The day started with introduction to White Line sensors by Prof. Mathilda Colaco. The students were given in-depth understanding of the concept of the While Line Follower.

Post lunch students were given different tasks to do, such as the Speed Control of the Robot with respect to the Boot Switch and the White Line Follower.

The Students had an amazing learning experience and showed great enthusiasm executing the given challenges. They suggested that such workshops should be conducted in future that would provide learning beyond curriculum.

e-Yantra Robotics Lab Set-up in DBCE

The e-Yantra Lab setup Inaugural and Valedictory function of Task Based Training was scheduled on the 30th of Aug 2019 at 3:00pm, which was to take place online with IITB.

The ceremony started with an opening address by the e-Yantra Team. The function at DBCE commenced with lighting a lamp and symbolic ribbon cutting ceremony by the Director, the Principal and the Head of ETC Department.

This was followed by the opening of the e-Yantra signage which symbolically declares
The Lab inaugurated. Dr. Varsha Turkar then handed over the robotic kitto Team Leader Prof. Flavia Leitao.

The e-Yantra Faculty Team, comprising of Prof. Flavia Leitao, Prof. Yeshudas Muttu, Prof. Mathilda Colaco and Prof. Deron Rodrigues were felicitated for successfully completing the task based training. The team was awarded **Grade A**in this training.

The floor was transferred back to IITB e-Yantra team, where they welcomed the Don Bosco College of Engineering to the e-Yantra family by using a "Diya Application".
Thereafter the student's e-Yantra team was installed.

e-Yantra Task Based Training 2019-20

e-Yantra is a Project hosted by IIT Bombay to spread education in Embedded systems and Robotics in colleges across India and sponsored by MHRD through NMEICT. The main purpose of DBCE to engage with e-Yantra was to empower teachers and students to create a culture of innovation and entrepreneurship in our college.

With this Objective in mind, the e-Yantra team of DBCE which includes Prof. Flavia Leitao, Prof. Yeshudas Muttu, Prof. Mathilda Colaco and Prof. Deron Rodrigues, along with our HOD Dr. Varsha Turkar came up with an innovative Teaching- Learning strategy, which was Task Based Learning meaning Learning by Doing.

The e-Yantra student's team of DBCE was formed and were given study material which the students were expected to go through and perform the related task.

The students learnt to Interface the Firebird Robot with the LED, LCD, Buzzer, Boot Switch, Motors and carry out tasks like performing a particular motion, controlling the speeds, displaying particular data, line followers and so on.

The various tasks were floated with definite deadlines and the students showed keen interest in performing these tasks well before deadlines and enjoyed working on these tasks.
The Judging team had a tough time evaluating the different teams. It was an overwhelming experience to see such enthusiasm amongst out students.

e-Yantra Project- Automatic Shopping Mart using Fire Bird V Robot

Brief Idea of project:

Designing a standalone mart which will take customer orders, handle billing and manage inventories using a website and pick and place the products using Robot .This would help to have a business model which will require less human intervention, thereby making it more profitable.
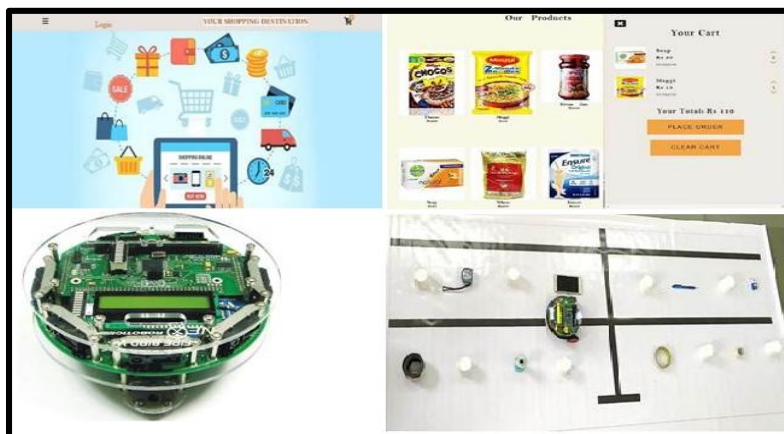

Project Members:

- Mr. Saif Ahmed Sayed
- Mr. Silvester Vaz
- Mr. Vaishakh Sanjeevan
- Ms. Sibga Shaikh

Project Guides:
- Prof. Flavia Leitao
- Prof. Yeshudas Muttu

Awards and Participation:
- Paper selected for Equinox 2020 Conference
- Idea selected for IEEE project exhibition "Hexagon"

Applications:

- This autonomous shopping system will provide its services at the customer's doorstep
- The robot will automate the tasks carried out in a shopping centre thereby reducing manpower and cost

Workshop- Two-day hands on training on "Robotics with Firebird V"

The e-Yantra Robotics Team of Electronics & Telecommunication Department of DBCE organized a Two Day Workshop on Firebird V Robot for the students of TE ETC, on 26th & 27th of March 2021. The purpose of the Workshop was to spread education in Embedded systems and Robotics.

The first session was taken up by Prof. Yeshudas Muttu on Introduction to Robotics that included Major Components such as Sensors, Actuators, Control system, Intelligence, Power supply, Communication, Indicating Devices of a Robot and Introduction to Firebird V ATmega 2560. Subsequently, the students were given hands-on exposure in Embedded C programming for interfacing the Buzzer, Boot Switch and Bar-graph LED using the Atmel-6 Studio.

The second session was taken by Prof. Flavia Leitao on interfacing the LCD with the Firebird V Robot. The Students were briefed on the LCD operation and were then asked to interface the LCD and the Boot Switch for a given application. This was followed by interfacing of the Motors. They were them taught how to interface the Motors and device an application to make the Robot move in a defined direction.

The sessions on the second day were taken by Prof. Deron Rodrigues. First session included introduction to counters and timers in ATmega 2560 for calculating time delays for various applications. Subsequently Pulse Width Modulation (PWM) was introduced followed by hands-on program to control the Velocity of the Motors. The next session included overview on the sensors like Sharp IR sensors, Proximity Sensor etc, interfaced to the different channels of ATmega2560 followed by ADC initialization and programming.

Workshop- Two-day hands-on Workshop on "e- Yantra Robotics"

The e-Yantra Robotics Faculty Team of Electronics & Telecommunication Department of DBCE organized a Two Day Workshop on Firebird V Robot for the students of TE ETC, on 29th & 30th of October 2021. The purpose of the Workshop was to spread education in Embedded systems and Robotics.

The Workshop would also ensure better Final year projects in this area. The students were divided into 7 teams with 5 members in each team, thus training 35 students to work on the Firebird V Robot. The resource persons for the workshop were Prof. Flavia Leitao, Prof. Yeshudas Muttu, Prof. Deron Rodrigues and Prof. Mathilda Colaco.

The students were given a brief introduction to Robotics that included Major Components such as Sensors, Actuators, Control system, Intelligence, Power supply, Communication, Indicating Devices of a Robot and Introduction to Firebird V ATmega 2560. They were the taught to Interface the Buzzer, LED, Boot Switch, LCD, Motor and the different sensors like the Proximity sensor, White Line Sensor, etc.
There were also given training to implement different applications like, different kinds of motions, Speed Variation using PWM, Obstacle detection, White Line Follower and so one. The Students had an amazing learning experience and showed great enthusiasm executing the given challenges.

Workshop- Two-day hands-on Workshop on "e- Yantra Robotics"

The e-Yantra Robotics Faculty Team of Electronics & Telecommunication Department of DBCE organized a Two Day Workshop on Firebird V Robot for the students of SE ETC, on 25th & 26th of March 2022. The purpose of the Workshop was to spread education in Embedded systems and Robotics. The resource persons for the workshop were Prof. Flavia Leitao, Prof. Yeshudas Muttu, Prof. Deron Rodrigues and Prof. Mathilda Colaco.

The students were given a brief introduction to Robotics that included Major Components such as Sensors, Actuators, Control system, Intelligence, Power supply, Communication, Indicating Devices of a Robot and Introduction to Firebird V ATmega 2560. They were the taught to Interface the Buzzer, LED, Boot Switch, LCD, Motor and the different sensors like the Proximity sensor, White Line Sensor, etc. There were also given training to implement different applications like, different kinds of motions, Speed Variation using PWM, Obstacle detection, White Line Follower and so one.