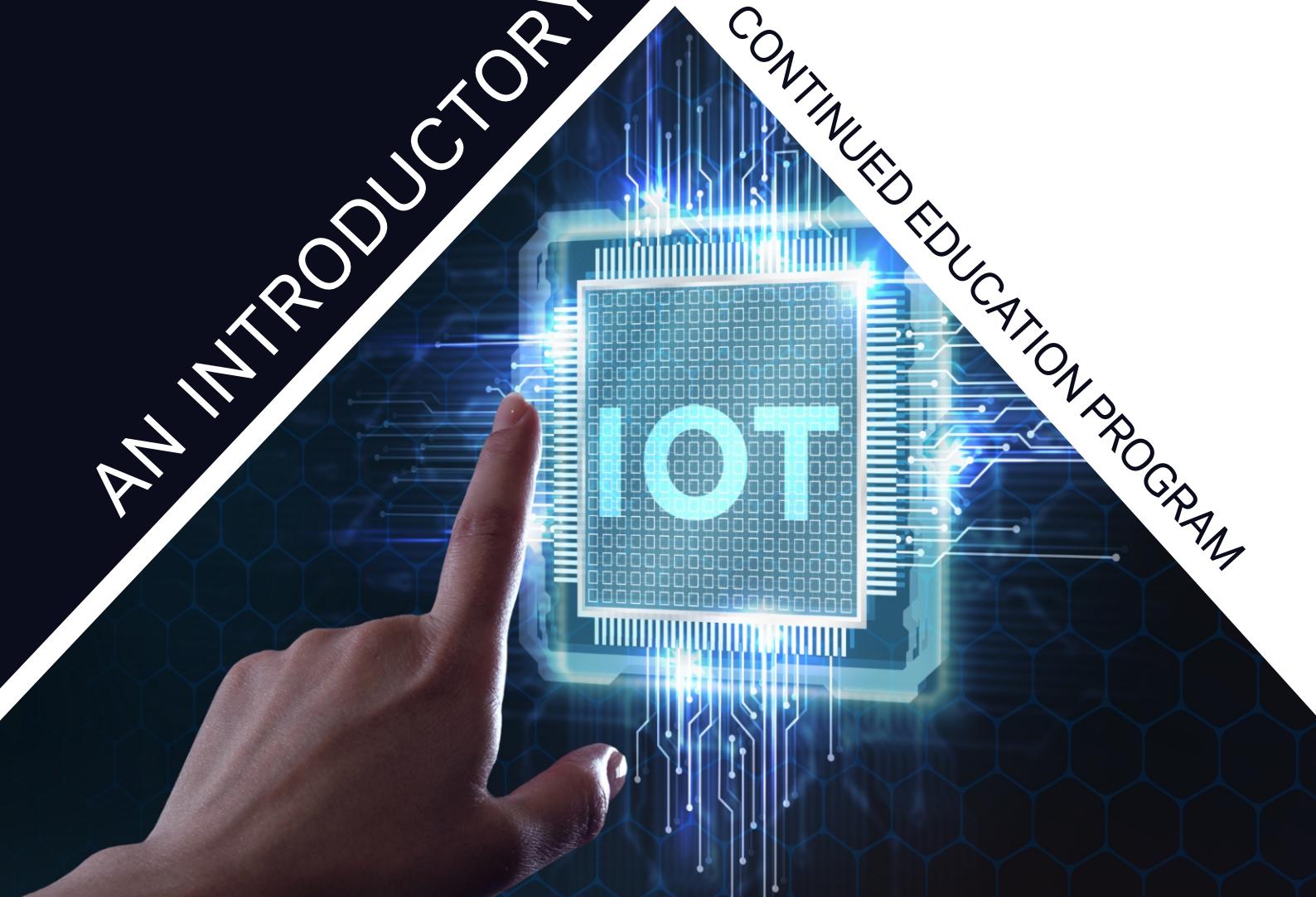




eYANTRA
Engineering a better tomorrow

INTERNET OF THINGS

AN INTRODUCTORY WORKSHOP
CONTINUED EDUCATION PROGRAM

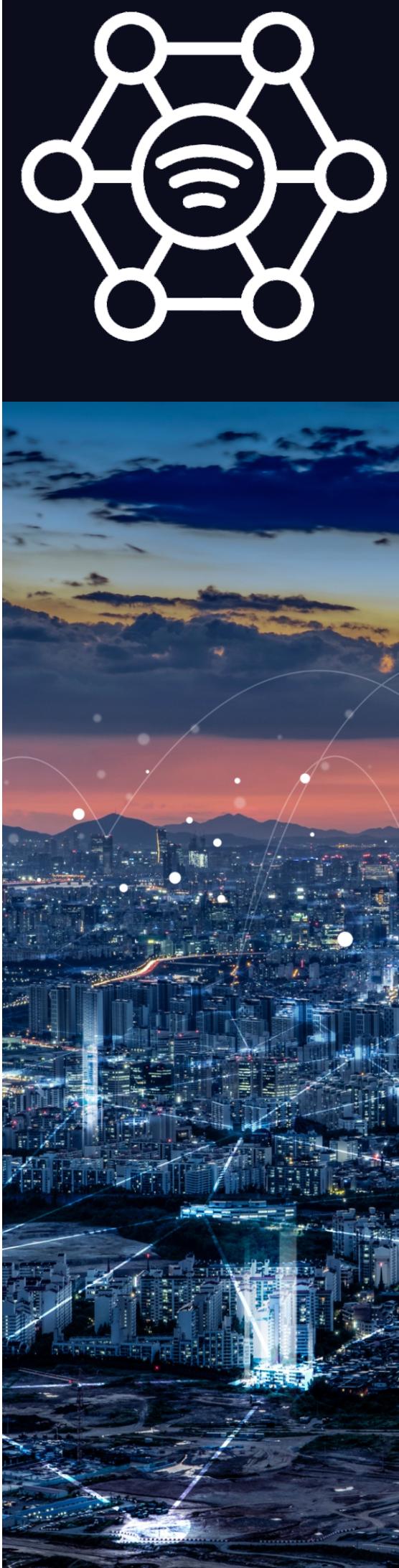


OVERVIEW

Household electronics, computers, laptops, automobiles, etc. have been around for many decades, and most of us have used them in our daily lives. Then something happened, where the Internet became more accessible and affordable for everyone.

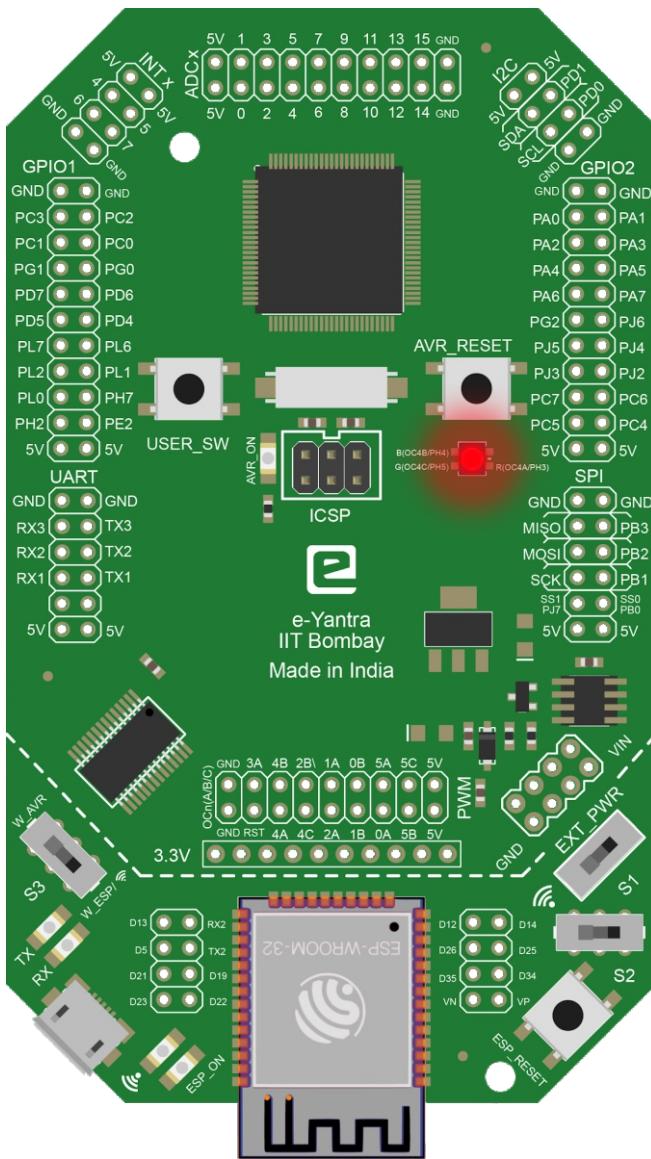
With the availability of the Internet, devices all around us can now talk to each other, and at the same time, one can control them from anywhere.

All these devices now constitute the Internet of Things (IoT). IoT has become of interest in multiple fields/domains, hence multi-disciplinary. IoT is being used to address problems in agriculture, automation, healthcare, transportation, surveillance, etc.





The eYFi-Mega Development Board



SPECIFICATIONS

ATmega2560 and ESP32 based development board

12.5 W of Output Power

Wi-Fi compatible

Bluetooth Low Energy

Over-The-Air Update

Compatible with FreeRTOS

Arduino Programming Language Compatible

On-Board File Storage



THE eY Line Follower Array

SPECIFICATIONS

8 Sensor Eyes (QRE1113).

I2C interface.

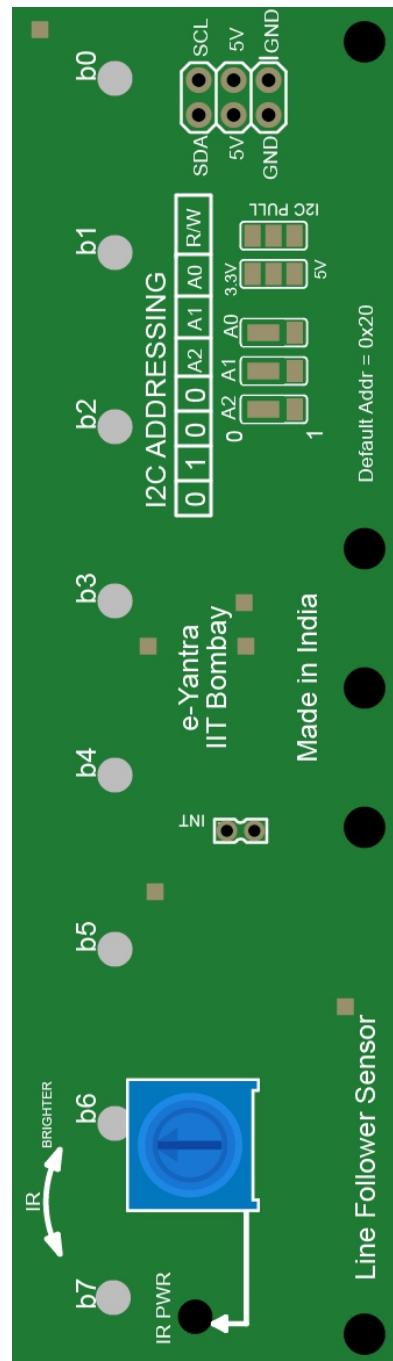
Adjust IR brightness on the fly with a knob.

Switch IR on and off with software.

Switch visual indicators on and off with software.

Invert dark/light sight with software.

Based on the MCP23017 I/O Expander.





VALUE

WHAT DOES THE COURSE OFFER?

This course will look into the essential knowledge required to build an IoT system; broadly speaking, the system will have a micro-controller, sensors, actuators, and wireless module.

WHO WILL BENEFIT?

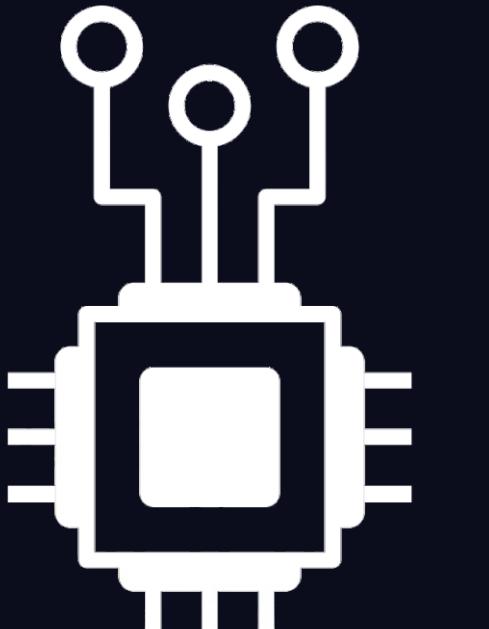
Anyone and everyone who is interested in understanding how to build a basic IoT system must have a basic knowledge of “C” programming.

ADVANTAGE: HANDS-ON FACILITY

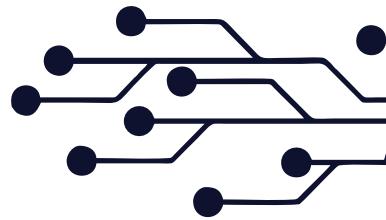
The participants will work on the eYFi-Mega development board, one of the products of e-Yantra, which the participants will get to take home. All the tools required for the hands-on session for the development board will be provided.

REQUIREMENTS

The participants will need to bring their laptops for the duration of the course. The minimum specification of the laptop should be:

- Windows OS (10 and above)
 - Minimum 8 GB RAM
 - 50 GB free storage on HDD/SDD
- 

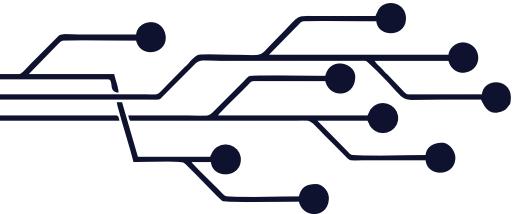
SCHEDULE



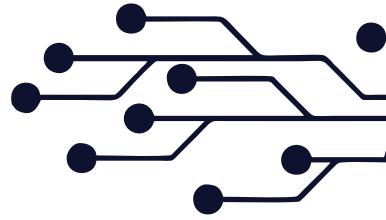
DAY 1

- Overview of the IoT Workshop and planned modules.
- Introduction to development board eYFi-Mega.
- Understanding the use of micro-controllers in IoT systems.
- Overview ATmega2560 micro-controller architecture and importance of I/O ports.
- Basic architecture of ESP32 with importance on wireless capabilities.
- Getting familiar with VS Code and writing the first program to interface onboard LED and interfacing DHT11 to I/O pins.

DAY 2



- Understanding Inter-Integrated Circuit (I2C) Protocol and interface OLED to display DHT11 values.
- Interfacing LDR module to regulate the intensity of LED light by using on-chip ADC and timers for PWM.

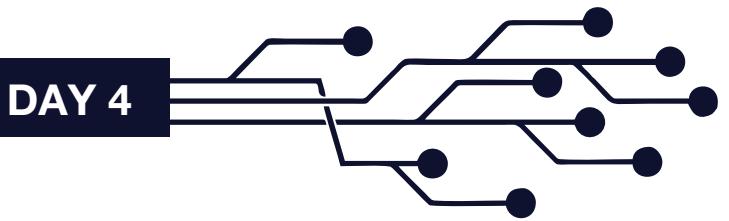


DAY 3

- Understanding Universal Asynchronous Receiver Transmitter (UART) Protocol to use for communication between ATmega and ESP32.
- Writing a program to read sensor value on ATmega and sending it to ESP32.
- Introduction to MQTT and HTTP, writing programs to send sensor values to Google Sheets using both protocols.

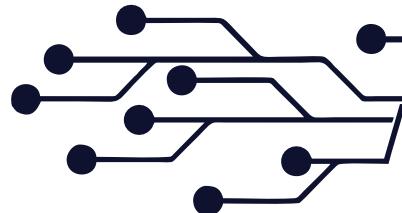
SCHEDULE

DAY 4



- Writing Google App script to automate actuators based on patterns seen on sensor data
- Exploring visualization tools like Grafana for viewing data, and using python library to understand trends in data using time series analysis.

DAY 5



- Capstone project: Building a smart home solution using the codes and knowledge gained so far.
- The project will use all the hardware used to learn concepts and programs written to actuate light and fan in a classroom environment.
- How to implement the capstone project with available development boards in the market?

FOR FURTHER QUERIES



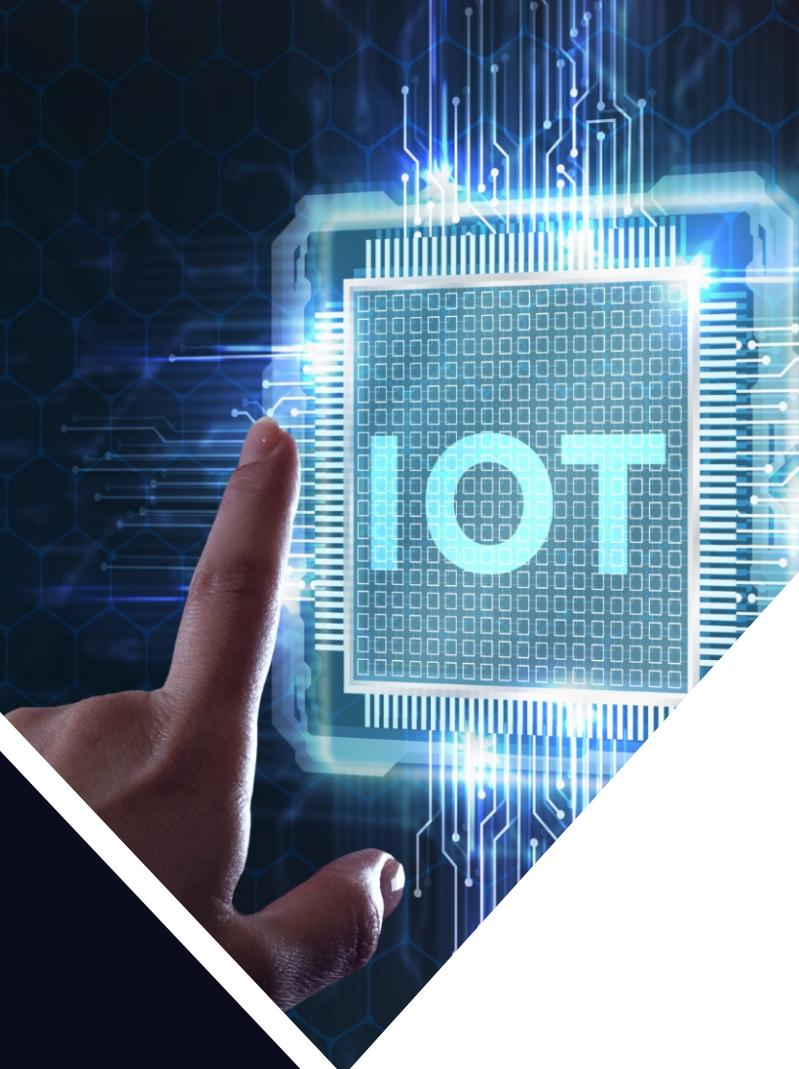
iot@e-yantra.org



+91 22 2576 4986
+91 22 2572 0184

ADDRESS

ERTS Lab,
First Floor, KReSIT Building,
IIT Bombay, Powai,
Mumbai - 400076, Maharashtra.



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