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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Report on

Hands on Training on Interfacing of Sensors



Organized by IEEE Student Branch, KSSEM

In association with IEEE Bangalore section.

Topic: Hands on Training on Interfacing of Sensors

Date of event: 21st May, 2023

Venue: Aryabhatta Seminar Hall, Dept of ECE, KSSEM

Number of participants: 60

Targeted Audience: 3rd year ECE students

Event Coordinator: Dr. Girish V Attimarad, Professor, KSSEM

The IEEE Student branch in association with the ECE department, of KSSEM, had organized a Hand on training on, “**Interfacing of Sensors**” on 21st May, 2023 at 9:30am IST.

The Hands on Training was conducted at K.S School of Engineering & Management, Bangalore. The training was given by Mr Rahul Kumar A and Mr Bharath Gowda P S, Founder and Engineer, Inversa Technosoft. Dr Ramanarasimha, Principal, Dr.K Senthil Babu, HoD of ECE, graced the event with their presence. The Hands on training was attended by both faculty members and students.

The objective of the training is given below;

- To introduce the students to various commonly used sensors and their working principles;
- To interface the sensors with microcontrollers and write simple code to acquire data from the sensors.
- To formulate applications based on the knowledge acquired.



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Topics Covered:

The training covered various aspects of interfacing. Some of the topics discussed were:

- Introduction to Arduino Microcontroller
- Different types of Arduinos
- Interfacing RGB to LED using Arduino
- Interfacing IR Sensor
- Interfacing ultrasonic sensors
- Interfacing LDR using Arduino

At last all the students discussed about their mini project individually.

Introduction to Arduino Microcontroller

Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices.

Different types of Arduinos

- 1) **UNO and MKR** is fairly beginner friendly, with the more expensive MKR offering greater connectivity (WiFi and Bluetooth) options.
- 2) **Mega** is good for robotics projects, including CNC machines and 3D printers.
- 3) **Nano** families are cost effective alternatives to the MKR, and are good for networks of sensors.
- 4) **Due** is good for efficient graphics and sound processing.
- 5) **Leonardo and Micro** are good alternatives to the UNO, particularly for USB connectivity.
- 6) **Yun** offers an embedded Linux system which can function as a multi-tasking server
- 7) **Portenta** is incredibly powerful.

Interfacing RGB to LED using Arduino

RGB LEDs consist of one red, one green, and one blue LED. By independently adjusting each of the three, RGB LEDs are capable of producing a wide color gamut. Unlike dedicated-color LEDs, these do not produce pure wavelengths. Modules may not be optimized for smooth color mixing.

Interfacing IR Sensor

The IR sensor has a **3-pin** connector that interfaces it to the outside world. The connections are as follows: **VCC** is the power supply pin for the IR sensor which we connect to the 5V pin on the Arduino. **OUT** pin is a 5V TTL logic output. **LOW** indicates no motion is detected, **HIGH** means motion is detected.



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Interfacing Ultrasonic sensors

To interface an ultrasonic sensor with an Arduino board, you need to **connect the Vcc pin to the 5V pin and the GND pin to the ground (GND) pin of the Arduino board**. The Trigger pin of the sensor should be connected to a digital pin of the Arduino board.

Interfacing LDR using Arduino

LDR sensor module is used to detect the intensity of light. It is associated with both analog output pin and digital output pin labeled as AO and DO respectively on the board. When there is light, the resistance of LDR will become low according to the intensity of light. The greater the intensity of light, the lower the resistance of LDR. The sensor has a potentiometer knob that can be adjusted to change the sensitivity of LDR towards light.

Finally with all the interfacing connections the objective of the hands on training session was achieved and also the hands on training were organized for the skill development which was achieved. Students cleared their doubts and were sure about the connections of Arduino.



Fig 1. Inauguration of Hands on training on interfacing of sensors



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Fig 2. Students Interfacing various sensors and to Arduino



Fig 3. Principal, Guest Speaker, Facultyes and Students present in the Event

Coordinator

Signature of HoD, ECE

Professor & Head

Dept. of Electronics & Communication Engineering,

K. S. School of Engineering & Management

Bangalore-560 109



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REPORT ON

Hands on Training on Application of IoT Using Blynk and Google Firebase Cloud



Organized by IEEE Student Branch & SS Technologies

Topic: Hands on Training on Application of IoT Using Blynk and Google Firebase Cloud.

Date of event: 8-7-2023 to 9-7-2023

Venue: Computer Networks Lab, Dept of ECE, KSSEM

Number of participants: 75

Targeted Audience: 2nd year ECE students

Event Coordinator: Mrs Jayashree G R & Mrs Bhargavi V S, Assistant Professor, Dept of ECE, KSSEM

The IEEE Student branch in association with the ECE department, of KSSEM, had organized a Hands on training on "Application of IoT Using Blynk and Google Firebase Cloud" from 8-7-2023 to 9-7-2023 at 9:00am IST.

The Hands on Training was conducted at K.S School of Engineering & Management, Bangalore. The training was given by Mr Srinivas Shetty, Founder SST Technologies. Dr.K Senthil Babu, HoD of ECE, graced the event with their presence. The Hands on training was attended by both faculty members and students.





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Topics Covered:

The training covered various aspects of interfacing. Some of the topics discussed were:

- Introduction to ESP Board
- LDR Control through Cloud
- LED Control through Cloud
- LED Control through Bluetooth
- Blinking of LED
- Serial Communication (UART)

Introduction to ESP Board

ESP8266EX is capable of functioning consistently in industrial environments, due to its wide operating temperature range. With highly-integrated on-chip features and minimal external discrete component count, the chip offers reliability, compactness and robustness.

The ESP8266EX microcontroller integrates a Tensilica L106 32-bit RISC processor, which achieves extra-low power consumption and reaches a maximum clock speed of 160 MHz. The Real-Time Operating System (RTOS) and Wi-Fi stack allow about 80% of the processing power to be available for user application programming and development.

LDR Control through Cloud

An LDR or light dependent resistor is also known as photo resistor, photocell, and photoconductor. It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor, then the resistance changes. These resistors are often used in many circuits where it is required to sense the presence of light. These resistors have a variety of functions and resistance. For instance, when the LDR is in darkness, then it can be used to turn ON a light or to turn OFF a light when it is in the light.

This resistor works on the principle of photo conductivity. It is nothing but, when the light falls on its surface, then the material conductivity reduces and also the electrons in the valence band of the device are excited to the conduction band. These photons in the incident light must have energy greater than the band gap of the semiconductor material. This makes the electrons to jump from the valence band to conduction.

LED Control through Cloud

An LED display cloud system is a type of software platform that allows users to remotely manage and control LED displays through a cloud-based interface. These systems typically consist of two main components: the LED display hardware and the cloud-based software platform.



The cloud platform provides a web-based interface that allows users to remotely control the content displayed on the LED screens. This interface can be accessed from any device with an internet connection, such as a computer or smart phone. Through the platform, users can upload and schedule content to be displayed on the LED screens, monitor the performance of the displays in real-time, and receive alerts if any issues arise.

LED Control through Bluetooth

Bluetooth is a short-range wireless technology standard that is used for exchanging data between fixed and mobile devices over short distances and building personal area networks (PANs). In the most widely used mode, transmission power is limited to 2.5 mill watts, giving it a very short range of up to 10 metres (33 ft). It employs UHF radio waves in the ISM bands, from 2.402 GHz to 2.48 GHz. It is mainly used as an alternative to wire connections, to exchange files between nearby portable devices and connect cell phones and music players with wireless headphones.

Blinking of LED

Light-emitting diode (LED) is a semiconductor device that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

Serial Communication (UART)

UART (Universal Asynchronous Transmitter Receiver), this is the most common protocol used for full-duplex serial communication. It is a single LSI (large-scale integration) chip designed to perform asynchronous communication. This device sends and receives data from one system to another system.



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Fig 1. Inauguration of Hands on training on Application of IoT Using Blynk and Google Firebase Cloud.

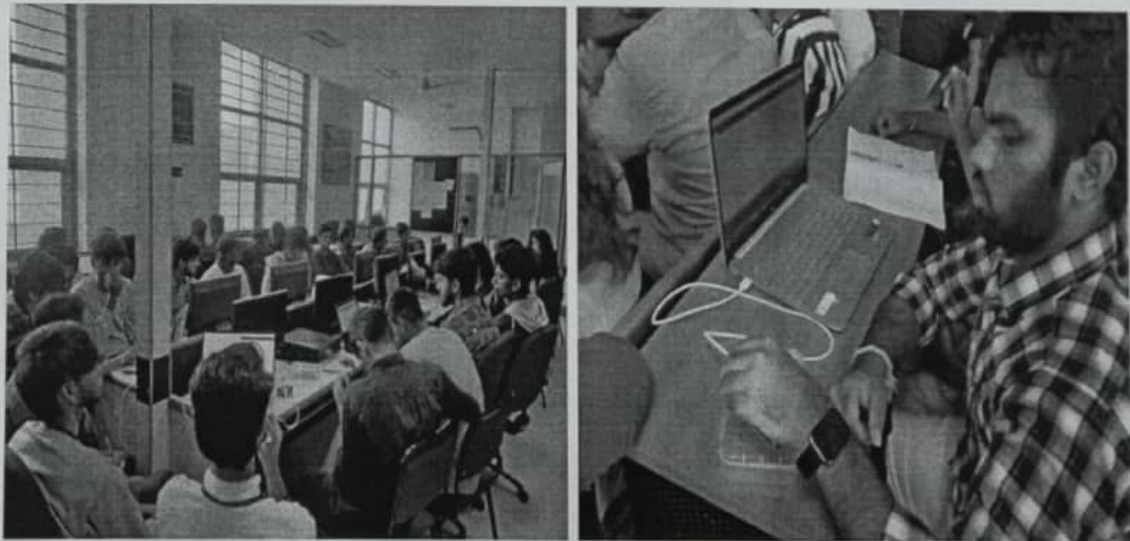


Fig 2. Students Interfacing various sensors and to Arduino

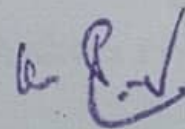
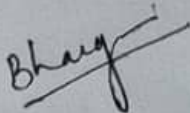


Fig 3. Guest Speaker, Faculties and Students present in the Event

Coordinator

Mrs Jayashree G R

Mrs Bhargavi Vijendra Sangam



**Signature of HoD, ECE
Professor & Head**

Dept. of Electronics & Communication Engineering
K.S. School of Engineering & Management
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REPORT ON

Hands on Training on Introduction to Embedded Systems



Organized by IEEE Student Branch & SS Technologies

Topic: Hands on Training on Introduction to Embedded Systems

Date of event: 8-7-2023 to 9-7-2023

Venue: Aryabhatta Seminar Hall, Dept of ECE, KSSEM

Number of participants: 62

Targeted Audience: 2nd year ECE students

Event Coordinator: Mrs Jayashree G R & Mrs Bhargavi V S, Assistant Professor, Dept of ECE, KSSEM

The IEEE Student branch in association with the ECE department, of KSSEM, had organized a Hands on training on "**Introduction to Embedded Systems**" from 8-7-2023 to 9-7-2023 at 9:00am IST.

The Hands on Training was conducted at K.S School of Engineering & Management, Bangalore. The training was given by Mr Rahul Kumar A and Mr Bharath Gowda P S, Founder and Engineer, Inversa Technosoft. Dr.K Senthil Babu, HoD of ECE, graced the event with their presence. The Hands on training was attended by both faculty members and students.





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Topics Covered:

The training covered various aspects of interfacing. Some of the topics discussed were:

- Blinking of LED
- RGB LED
- IR Sensors
- LDR Sensor
- Raindrop Sensor
- Motor Driver
- Line Follower Robot

Blinking of LED

A light-emitting diode (LED) is a semiconductor device that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

RGB LED

The working of RGB LED is it has four terminals, in which three colors red, green, blue, and one more terminal represent anode or cathode depending on its type. The emission of various colors using this LED can be achieved by changing or setting the intensity levels of internal LED's (red LED, the green LED, blue LED) and combining these colored outputs to display different colored outputs.

IR Sensors

IR sensor is an electronic device, that emits the light in order to sense some object of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation.

LDR Sensor

An LDR or light dependent resistor is also known as photo resistor, photocell, and photoconductor. It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor, then the resistance changes. These resistors are often used in many circuits where it is required to sense the presence of light. These resistors have a





Variety of functions and resistance. For instance, when the LDR is in darkness, then it can be used to turn ON a light or to turn OFF a light when it is in the light. A typical light dependent resistor has a resistance in the darkness of $1\text{M}\Omega$, and in the brightness a resistance of a couple of $\text{K}\Omega$

Raindrop Sensor

Raindrop Sensor is a tool used for sensing rain. It consists of two modules, a rain board that detects the rain and a control module, which compares the analog value, and converts it to a digital value. The raindrop sensors can be used in the automobile sector to control the windshield wipers automatically, in the agriculture sector to sense rain and it is also used in home automation systems.

Motor Driver

A motor driver IC is an integrated circuit chip that controls motors in autonomous robots and embedded circuits. L293D and ULN2003 are the most commonly used motor Driver IC that is used in simple robots and RC cars.

Line Follower Robot

Line Follower Robot (LFR) is a simple autonomously guided robot that follows a line drawn on the ground to either detect a dark line on a white surface or a white line on a dark.

Infrared sensors consist of two elements, a transmitter and a receiver. The transmitter is basically an IR LED, which produces the signal and the IR receiver is a photodiode, which senses the signal produced by the transmitter. The IR sensors emits the infrared light on an object, the light hitting the black part gets absorbed thus giving a low output but the light hitting the white part reflects back to the transmitter which is then detected by the infrared receiver, thereby giving an analog output. Using the stated principle, we control the movement of the robot by driving the wheels attached to the motors, the motors are controlled by a microcontroller.



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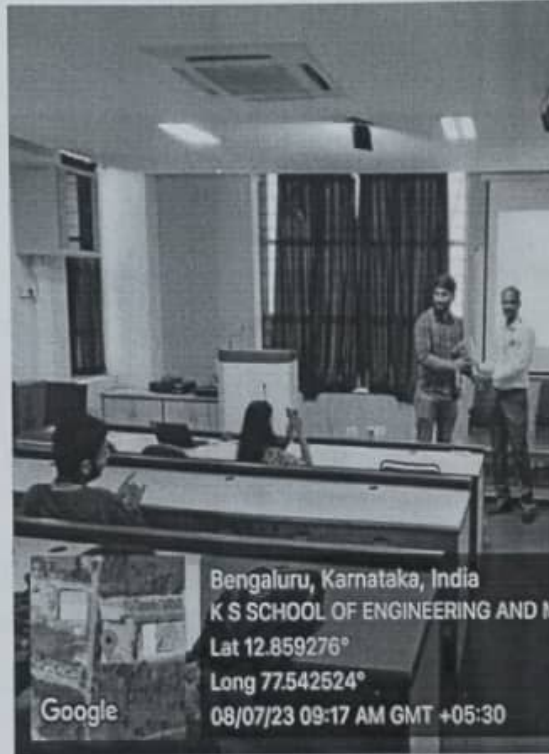


Fig 1. Inauguration of Hands on training on Introduction to Embedded Systems



Fig 2. Students Interfacing Line Follower Robot and Blinking LED

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Fig 3. Guest Speaker, Faculties and Students present in the Event

Coordinator

Mrs Jayashree G R

Mrs Bhargavi Vijendra Sangam

A handwritten signature in blue ink, appearing to be 'Jayashree', written over the printed name.

A handwritten signature in blue ink, appearing to be 'Bhargavi', written over the printed name.

A handwritten signature in blue ink, appearing to be 'Prof. Ravi', written over the printed name.

Signature of HoD, ECE

Professor & Head

Dept. of Electronics & Communication Engineering
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