LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS& COMMUNICATION ENGINEERING

Report on one-week workshop on "Exploring Embedded Systems with Raspberry Pi Pico"

Event Type	:	Workshop
Date / Duration	:	18th March 2024 to 23rd March 2024
Resource Person	:	Mr.S. Pradeep Kumar, Smart Home & Industrial Solutions Pvt. Ltd.
Name of Coordinator(s)	:	Dr.M.V.Sudhakar Reddy & Mr.Ch.Mallikharjuna Rao
Target Audience	:	IV Semester B.Tech Students
Total no of Participants:		IV semester Students-70 Nos.
Objective of the event:		To expose the students to the design environment of Embedded systems
Outcome of event	:	By attending the workshop, the students can be able to learn the advances in Embedded technology in addressing the real time issues and enhance their skills in doing Mini as well as Major projects, as part of the curriculum. Further, the students will gain knowledge on hardware design related issues that enables them to face. Knowledge about interfacing sensors with Raspberry Pi_Pico, for solving real time problems is gained.

Description / Report on Event:

The workshop on Embedded systems is conducted for one week to IV semester B.Tech ECE students. The workshop began with inaugural address by Dr.G.Srinivasulu, Head , Department of ECE ,who highlighted the significance of the training. It was mentioned that with the technology evolving faster the students should always update themselves with the current trends. Irrespective of running behind non-core jobs, students need to strength their core concepts and opt for a better carrier that is consistent. Dr.M.V.Sudhakar Reddy, Coordinator , RC club, have informed the students about initiatives taken by the department to enhance the learning and presentation skills of the students. It was

mentioned that the current trend is towards IoT enabled applications, all should effectively engage in the workshop and gain knowledge. Mr.Ch.Mallikharjuna Rao has coordinated the workshop.

Day one has begun with explanation about the basics of microprocessors by the resource person Mr.S.Pradeep Kumar from " Smart Home & Industrial Solutions Pvt. Ltd." The objective of the workshop is to educate the students about the embedded environment and provide solutions to real time problems. As these arethe days of coding in majority of the applications, knowledge about programming using microcontroller will enable in providing solutions to real time problems. Once the basic concepts were introduced, code is written for blinking of LED and the same is dumped onto Arduino board and executed. Along with this Motion sensor was also implemented using Arduino, that detects the presence of moving objects and preferred in shopping malls etc. for security applications.

Day 2 extended the concepts discussed on day 1, on which illumination control by making use of potentiometer. For better power saving, it is necessary to know the light intensity in a given room and then either switch ON or OFF a light. Light dependent resistor is incorporated for darkness detection there by controlling the light. Temperature and humidity sensors were interfaced with Arduino and verified for functionality.

Gas sensor was used to identify the presence of gas there by giving an indication using a buzzer on Day 3. The key application of this to preventfire accidents due to gas leakage in household applications. Magnetic sensor definitionis a sensor which is used to notice disturbances as well as changes within a magnetic field such as strength, direction, and flux. There are different types of detection sensors which can work on some of the characteristics like light, pressure, temperature. These sensors are separated into two groups. The first one is used to calculate thetotal magnetic field, whereas the second one is used to calculate vector components of the field. IR communication makes use of IR (Infrared) waves from the electromagnetic spectrum. An IR LED is used to transmit data wirelessly in digitalform (0 – LED OFF or 1 – LED ON).An IR photodiode or IR phototransistor receives this data. The IR receiver (IR photodiode or IR phototransistor) gives different current values according to the intensity of light. It is possible to modulate the data transmitted and there are special decoder IR receivers like TSOP1738 available that can receive the modulated data.

IR communication was continued on Day 4 where a relay module

is used to open or close a door. A relay is an electrically operated switch that can be turned on or off, letting the current go through or not, and can be controlled with low voltages, like the 5V provided by the Arduino pins. This relay module has two channels (those blue cubes). There are other models with one, four and eight channels. Day 5and day 6 continued with programming practice along with revision of transistor concepts.

The transistor acts a switch and this principle is used to detect thewater flow. Tinkercad environment was introduced to simulate the IoT environment.

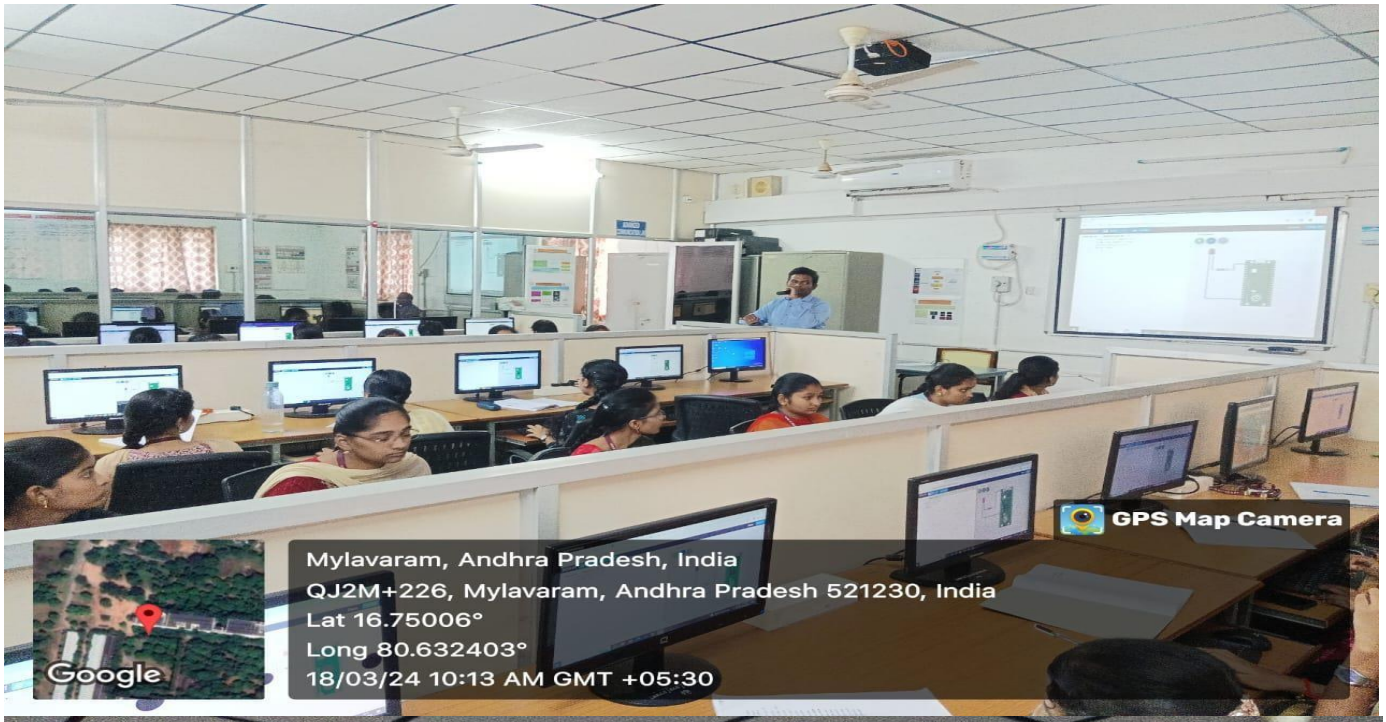
Feedback / Suggestions:

1. More number of sensors are to be incorporated
2. Provision of Individual kits
3. More real time applications need to be addressed
4. More attention towards individual students for clarifying doubts.

Comments on feedback:

1. It is not necessary to all sensors in the workshop as the usage decides which sensor to use. As the process to interface few sensors has been introduced, the same can be extended for any sensors.
2. Provision of more kits will be considered when the workshop is organized in future.
3. Irrespective of the application, as usage of **Raspberry Pi Pico** environment has been introduced any application can be addressed and not needed to cover all applications.
4. Generally, it is intended to encourage team work discussions among the group isthe best way to clarify the doubts.

Workshop Photo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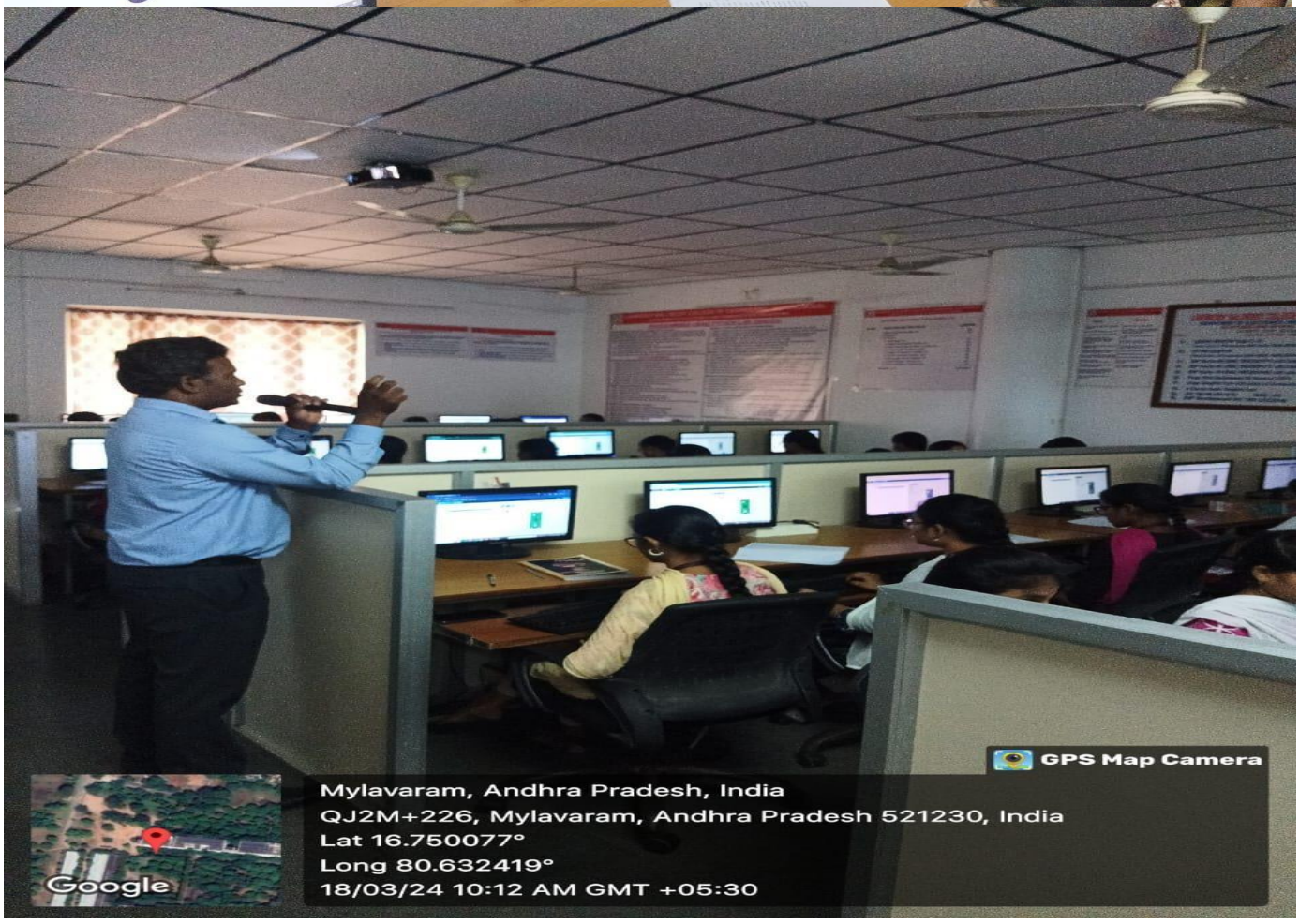
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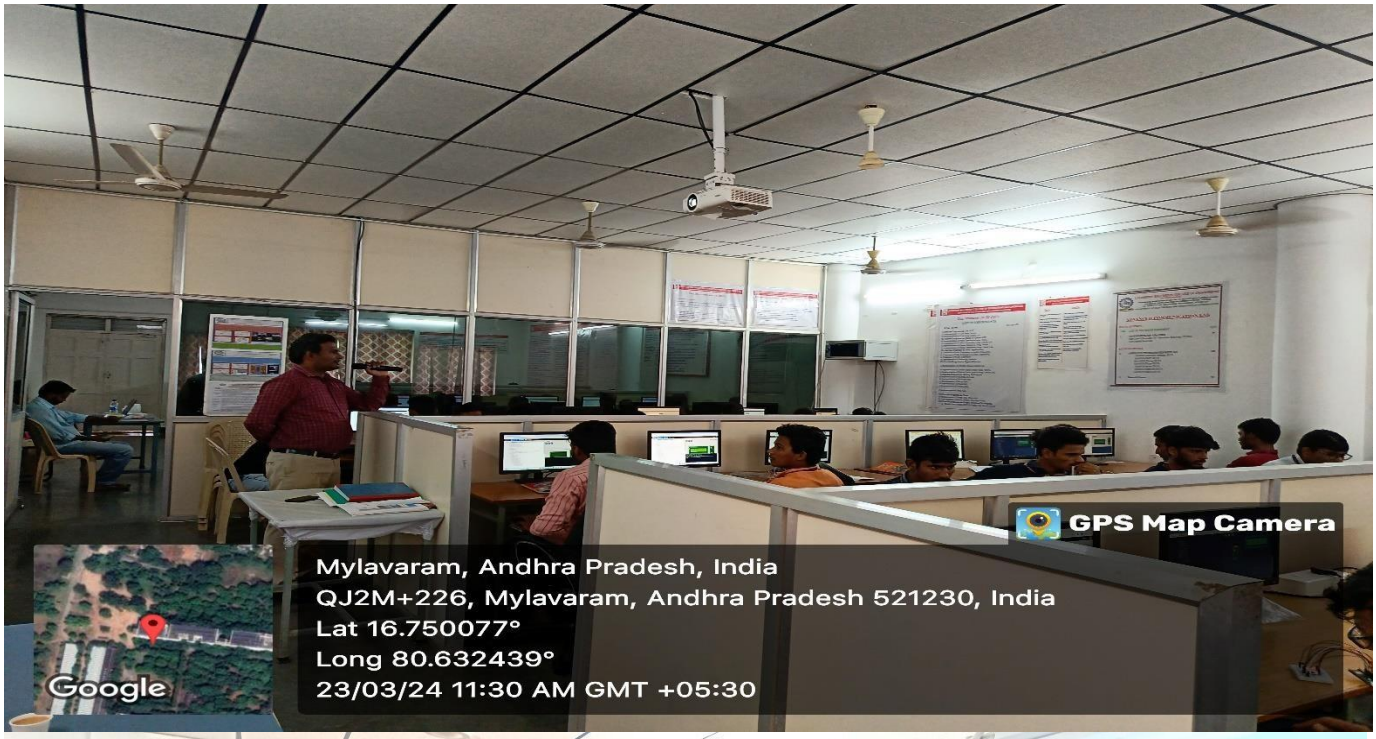

Skill Development Coordinator	RC Club Coordinator	HOD, ECE
Mr.CH.Mallikharjuna Rao	Dr.M.Venkata Sudhakar	Dr.G.Srinivasulu