MANIPAL INSTITUTE OF TECHNOLOGY
BENGALURU
(A constituent unit of MAHE, Manipal)

IEEE SB and IEEE CIS

ESP 32 Workshop- Gateway to Edge ML

17.10.2024 – 18.10.2004

Content of Report (index)

1. **Introduction of the Event**
   This workshop was an introduction to the ESP 32 Microcontroller, which is a low-cost, low-power chip that provides Wi-Fi and Bluetooth connectivity for embedded devices. It's designed for IoT applications, wearable electronics, and mobile devices. The main idea of this event is to educate the students participating in this workshop about the microcontroller and its daily life applications

2. **Beneficiaries of the Event**
   This competition had been planned keeping in consideration target audience of 1st, 2nd, 3rd and 4th years.

3. **Brief Description of the event**
   This workshop was a 2-day event

   Day 1:

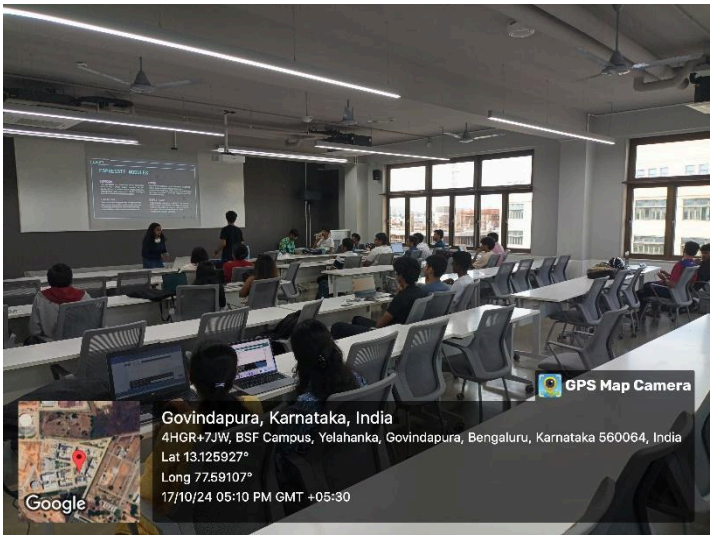
   - Introduction to Microcontrollers and Microprocessors: Explained the basic differences and functionalities of microcontrollers and microprocessors.
   - Connections to ESP32-CAM: Demonstrated how to connect the ESP32-CAM using an FTDI USB to TTL converter for programming.
   - Coding and Flashing: Performed coding in the Arduino IDE to control the ESP32-CAM.
   - Showed participants how to connect the ESP32-CAM to Wi-Fi.
   - Flashed code to the device, including a demonstration of LED flashing and starting a camera web server.

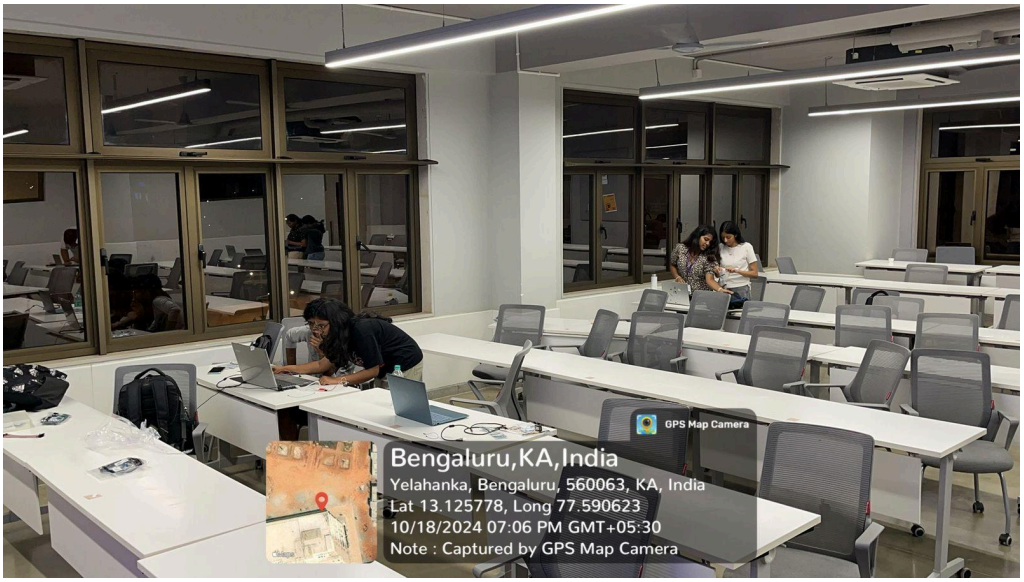
   Day 2:

   - Intruder Detection Model: Showcased an intruder detection model developed during the workshop.
   - Introduction to Edge Computing and TinyML: Discussed the significance of Edge computing and how TinyML enables machine learning on edge devices.

- Object Detection Model Creation: Explained essential steps like data acquisition and data augmentation etc for training models.
- Steps of Object Detection:
  (a) Data Acquisition: Collecting images or videos to train the model.
  (b) Data Annotation: Labeling the collected data to identify objects of interest.
  (c) Data Augmentation: Enhancing the dataset by applying transformations like rotation, scaling, and flipping to improve model robustness.
  (d) Model Training: Training the model using the annotated and augmented dataset.
  (e) Model Evaluation: Assessing the model's performance using validation datasets.
  (f) Model Deployment: Integrating the trained model for inference in real-time applications.
  (g) Guided participants in building their own object detection model to classify between rotten and fresh fruits using a small dataset.
- Edge Deployment: Demonstrated the deployment of the trained model to the ESP32-CAM, showcasing how it can perform object detection in real time.
- Integration with Arduino IDE: Demonstrated how to integrate the trained model with the Arduino IDE for running and inferring through the ESP32-CAM.

4. Photographs





5. Brochure or creative of the event

6. Schedule of the event

Date:- 17th – 18th October, 2023
Time:- 4 30pm to 6 30pm
Venue: AB4, Room No. 504

Moderated & Organised by: IEEE SB and IEEE CIS

7. Feedback report of the Event

The event was a success, with participants gaining valuable knowledge about the microcontroller. They had a lot of fun in programming the ESP 32 to do various stuff, like flashing the LED bulb and starting the camera web server

We collected about Rs1650 from the non-IEEE members who were interested to attend the workshop.

Date	Transaction ID	Particulars	Withdrawal	Deposit	Balance
15-10-2024		Opening Balance			0.01
16-10-2024	PH4101616677865 38	PAYMENT RECEIVED VIA UPI FROM VPA ABHYUDAY. B2006@OKHDFCBANK FROM RRN 429059532861		150.00	150.01
16-10-2024	PH4101616680902 85	ACCOUNT MAINTENANCE CHARGES OF RS. 42.00 FOR THE PERIOD JUL 24-SEP 24, AGAINST THE TOTAL AMOUNT OF RS. 42.0	49.56		100.45
16-10-2024	PH4101617692515 94	PAYMENT RECEIVED VIA UPI FROM VPA HARIHARAN22805@OKSBI FROM RRN 429056216248		150.00	250.45
16-10-2024	PH4101620769093 29	PAYMENT RECEIVED VIA UPI FROM VPA JHAAMBIKESH555-1@OKICICI FROM RRN 429054494168		50.00	300.45

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Date	Transaction ID	Particulars	Withdrawal	Deposit	Balance
17-10-2024	PH4101712913672 33	PAYMENT RECEIVED VIA UPI FROM VPA BHARDWAJARYA01@OKICICI FROM RRN 429118712700		150.00	450.45
17-10-2024	PH4101713916989 93	PAYMENT RECEIVED VIA UPI FROM VPA NAKSHATRA08814@OKHDFCBANK FROM RRN 429195276149		150.00	600.45
17-10-2024	PH4101713916994 39	PAYMENT RECEIVED VIA UPI FROM VPA JESSICAMARIAMMATHEWS@OKHDFCBANK FROM RRN 429195267317		150.00	750.45
17-10-2024	PH4101713919678 05	PAYMENT RECEIVED VIA UPI FROM VPA JEEVANTHANU836@OKAXIS FROM RRN 429162220107		150.00	900.45
17-10-2024	PH4101714934243 62	PAYMENT RECEIVED VIA UPI FROM VPA KUNDUSUBHAN@OKAXIS FROM RRN 429114319099		150.00	1050.45
17-10-2024	PH4101715950965 89	PAYMENT RECEIVED VIA UPI FROM VPA ANAGHACR04@OKHDFCBANK FROM RRN 429100833466		150.00	1200.45
17-10-2024	PH4101715951408 20	PAYMENT RECEIVED VIA UPI FROM VPA 9972482604@SBI FROM RRN 100004803621		150.00	1350.45
17-10-2024	PH4101715956647 78	PAYMENT RECEIVED VIA UPI FROM VPA SINGHKARMAN4105-1@OKHDFCBANK FROM RRN 429101693399		150.00	1500.45
17-10-2024	PH4101716982879 23	PAYMENT RECEIVED VIA UPI FROM VPA 9821901461-2@YBL FROM RRN 429151502971		150.00	150.45
19-10-2024	PH4101912497519 06	PAYMENT MADE VIA UPI TO VPA ATHARVALOTLIKAR03-1@OKHDFCBANK AGAINST RRN 429384205132	1650.00		
19-10-2024		Closing Balance			
Total Credits	1700.00		Total Debits	1699.56	

In the end, there was a creation of an ESP 32 project group, where interested participants could band together to undertake projects and research with the help of ESP 32 under the banner of IEEE SB and CIS

Acknowlegements:

We would like to extend our gratitude to all participants, speakers, and our faculty advisors whose contributions were instrumental in making the competition a success

Seal and Signature of Head with date