EEE 416 – Microprocessor and Embedded Systems Laboratory

Jan 2022 Level-4 Term-I Section A

Final Project Demonstration

SMART EVM with IOT and FINGERPRINT

SUBMITTED BY – GROUP C1.03

Samin Zawad
1706136

Mahadi Hassan
1706137

Shakhawat Iqbal Ovi
1706138

Nahid Ahmed
1706145

Md. Rokonujjaman
1706150

Ishmam Hasnat
1706153

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Outline

1. Summary
2. Introduction
3. Design
4. Implementation
5. Analysis and Evaluation
6. References

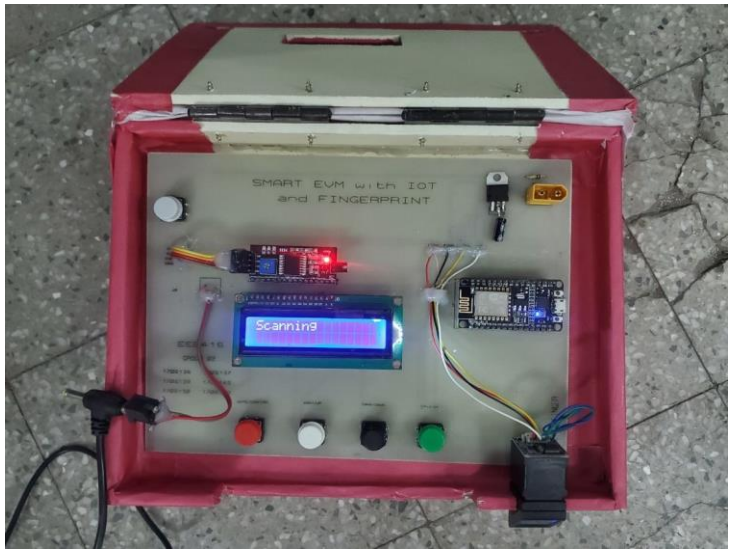
1. Summary / Abstract

- We implemented a IOT based electric voting machine that takes a voter's fingerprint, confirms identity, grants permission for Voting and updates the admin data sheet along with a public website

- **Server issue, Wi-Fi or internet unavailability detection with recovery voting system**

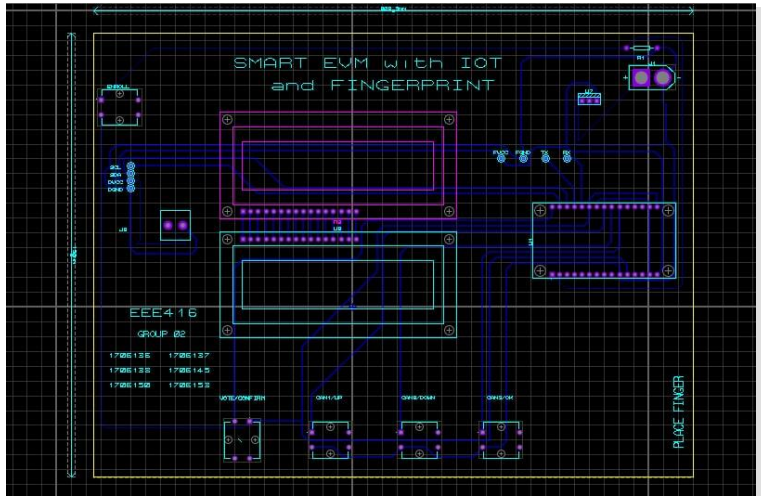
2. Introduction

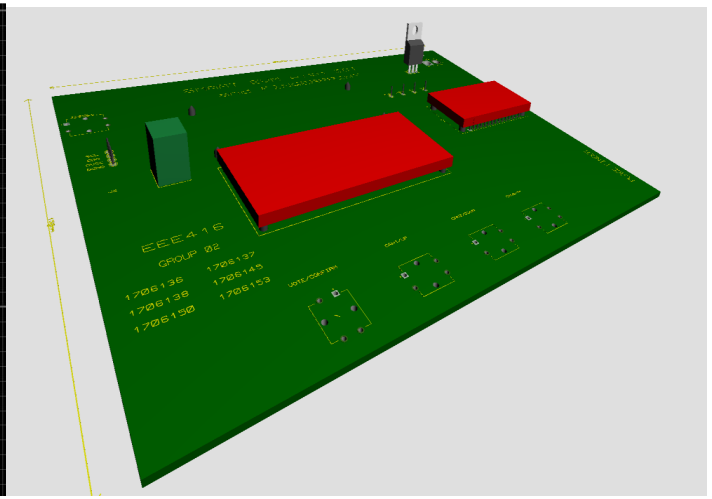
- IOT based EVM project (3 candidates)
- 2 step process, Voter enrollment with fingerprint and vote casting
- 2nd time vote casting detection, malfunction recovery, admin server and public access server update (real time)



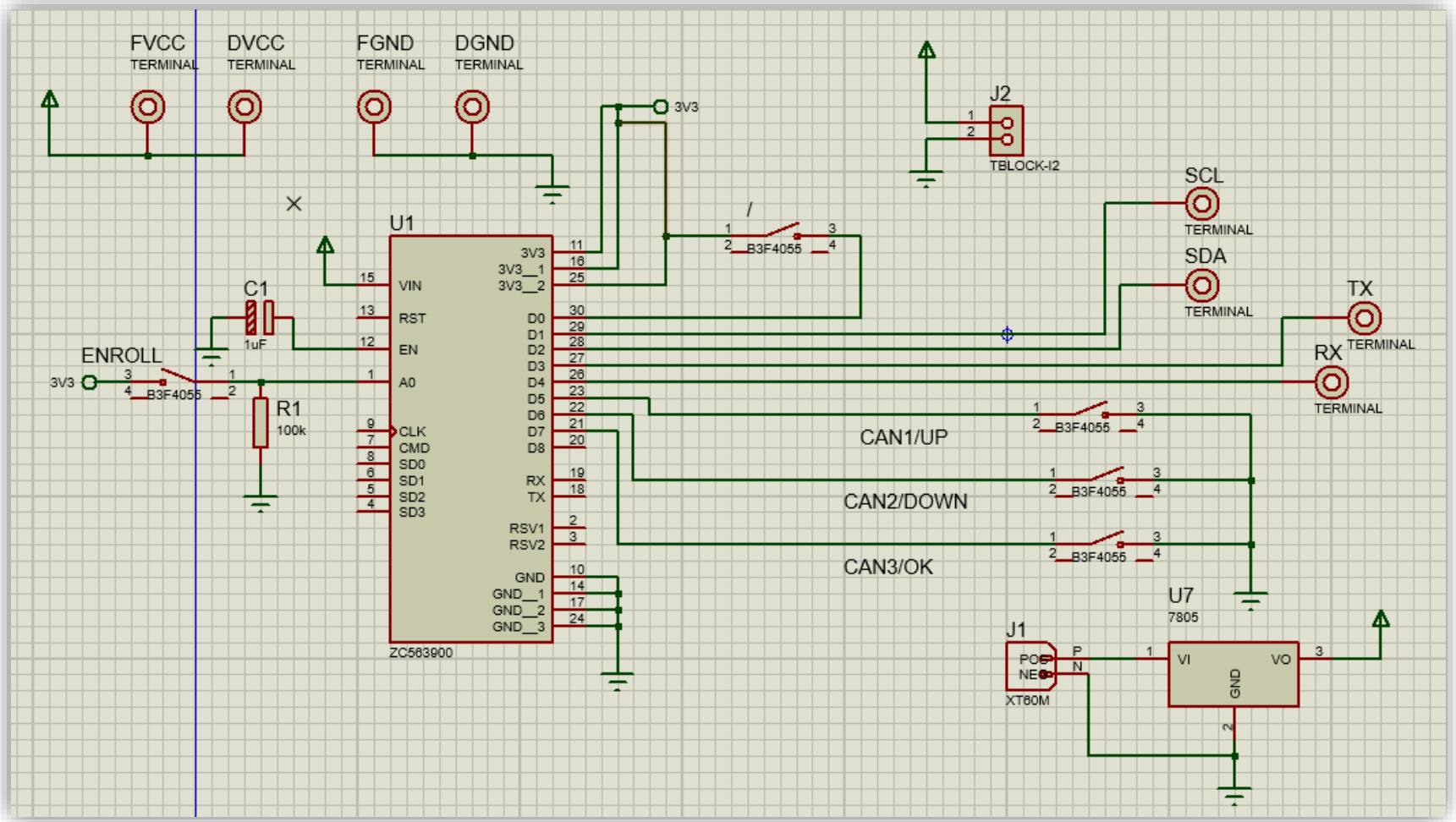
3.1 Design: Methods

- ❑Nodemcu ESP8266
- ❑I2C module
- ❑16*2 LCD Display
- ❑7805 Voltage Regulator
- ❑R-307 Fingerprint Sensor
- ❑11.1V Lipo
- ❑5V 2A adaptar

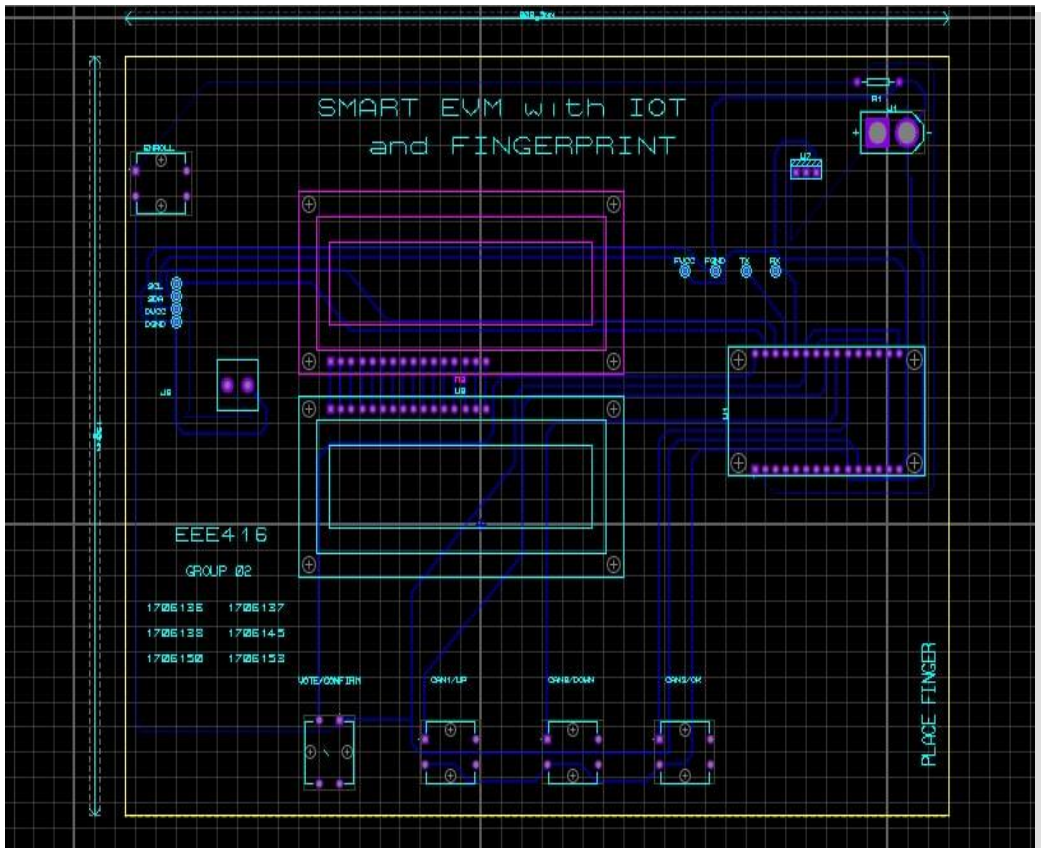


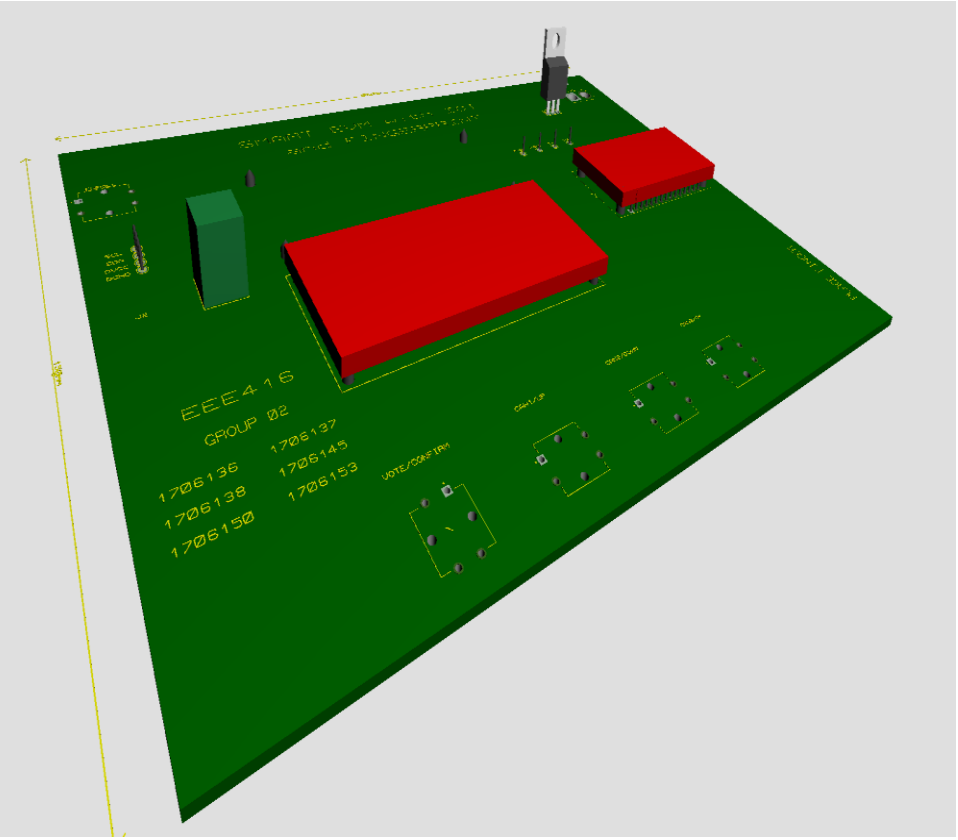


3.2 Design: Circuit Diagram



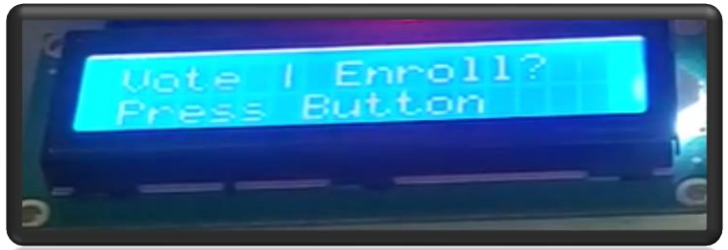
3.4 Design: PCB Layout and 3d rendering

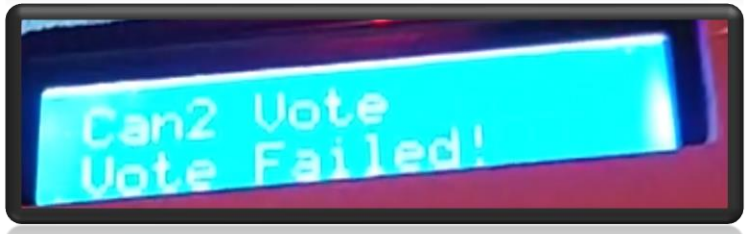


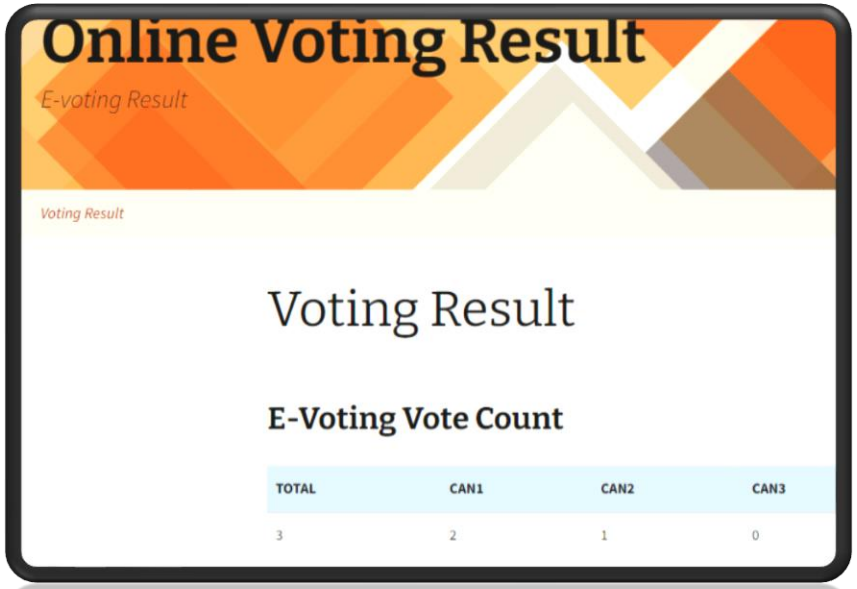


4 Implementation: Demonstration

4.1 Implementation: Photo Gallary







Total	Can1	Can2	Can3	
2	1	1	0	
Date	Time	Canditate1	Candidate2	Candidate3
8/31/2022	6:80:0b AM	0	1	0
8/31/2022	6:02:32 AM	1	0	0

4.2 Implementation: External Links

- GitHub link:

YouTube Link:

- https://www.youtube.com/watch?v=OSndbgKLA34

5.1 Novelty

- Dual power backup
- Real time update of vote & Update to website after a time interval
- Dual purpose (Voting + Enrolling)
- Detect suspicious activities because of Real Time Supervision
- ESP8266 is cheaper than ESP32
- No Arduino used
- Voter’s privacy is protected
- Human Error in pushing candidates voting button is managed
- Vote error due to internet disruption is dealt with

5.2 Project Management and Cost Analysis

Product	Model	Quantity	Unit Price(Tk)	Total(Tk)
Fingerprint sensor	R307	1	1300	1300
Wi-Fi Module	ESP 8266	1	200	200
Push Button		5	8	40
Wire		2	40	80
Omron Tactile Switch	SWT- 111212	10	5	50
40*1 Female Headers	1FPH25B401	3	12	36
XT60 Connector's Pair	CON- 10260	1	70	70
Multi Colors Cap for Tactile Push Switch	CAP-12121	10	2	20
Jia Long Xing 1200 mAh 11.1 V 3S 45C Li-Po Battery		1	1100	1100
2x16 LCD Display		1	250	250
I2C LCD adapter		1	90	90
L7805 IC		1	10	10
5V 2A AC to DC Adapter Power Supply Charger		1	240	240
PVC Plastic		1	200	200
PCB (5.5 Gis) 8'x 6' + Processing Charge		1		680
Total				**4366**

Per unit production cost is 4366 Tk.

5.3 Practical Considerations of the Design

- 5.3.1 Considerations to public health and safety
  - Voter's privacy is maintained
  - Operates in low voltage. So, no possibility to get shocked if malfunction happens.
- 5.3.2 Considerations to environment
  - Stops wastage of paper, ink.
  - Use of DC battery reduces electricity cost.
- 5.3.3 Considerations to cultural and societal needs
  - Leads to strengthening of democratic institution.
  - Reduced electrical fraud that make elected officials more accountable.

5.4 Assessment of the Impact of the Project

- 5.4.1 Assessment of Societal Issues: Reduce public gathering and make elected person more responsible.
- 5.4.2 Assessment of Health and Safety Issues: increase voter turnouts, integrity, and security and thus defends democracy.

- 5.4.3 Assessment of Legal Issues : Legal by the code of govt. rules. Detects the fault. changing the result under the cover of delayed announcement.
- 5.4.4 Assessment of Cultural Issues : Fortifying of equitable institution, it marginalized and powerless portion of society. Lessening discretionary extortion.

5.5 Evaluation of the Sustainability

- 5.5.1 Evaluation of Sustainability:
  - Reusable , cost effective, faster and more accurate collation of vote.
- 5.5.2 Evaluation of Impact of Design in Societal Context :
  - Fortifying of law-based institution ,diminishing appointive extortion.
- 5.5.3 Evaluation of Impact of Design in Environmental Context:
  - Reduce usage of wastages like paper and ballot. Also, reduce deforestation indirectly.

6.1 Mode of Team Work and Diversity

- We have worked together in hall to conjoin the segments of project.

- Our team members are from power major, communication major background. So, all of our member are qualified in different skill which helped to stand this project

6.2 Logbook of Project

Week	Timeline
7th	Component Purchased
8th	Implementation of Fingerprint Sensor
9th	Schematic Design and Implementation of Circuit
10th	IoT Design and Implementation
11th	Coding in Arduino IDE
12th	PCB design
13th	Soldering and Hardware Implementation in PCB
14th	Report writing and making Video Demonstration

7. References

- https://circuitdigest.com/microcontroller-projects/electronic-voting-machine-using-arduino
- https://www.electroniclinic.com/google-spreadsheet-or-google-sheets-with-esp8266-nodemcu-for-data-logging/
- https://github.com/adafruit/Adafruit-Fingerprint-Sensor-Library
- https://www.make-it.ca/nodemcu-details-specifications/