REMOTE LABS

ESW Project

Team 4-Mation

TEAM MEMBERS

- *Keerthi*
- *Meghana*
- *Harshitha*
- *Srihitha*

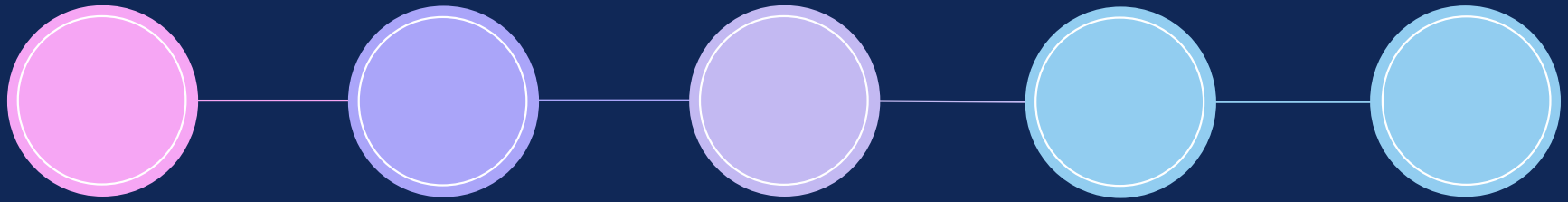
OUR PROJECT

Our Project ***Remote Labs*** *aims at providing an opportunity for people in remote places to perform experiments.*

OUR APPROACH

Our project provides users to perform experiment on DC Motor and analyze voltage vs RPM characteristics. User can vary the voltage from dashboard where voltage vs RPM graph and live streaming are provided for better user experience.

PROGRESS



Step 1

Hardware using breadboard and interactive input is done.

Step 2

Pushing data into Thingspeak and video streaming is done.

Step 3

Soldering of Hardware and made changes to dashboard for our requirements

Step 4

User login, Timer

Step 5

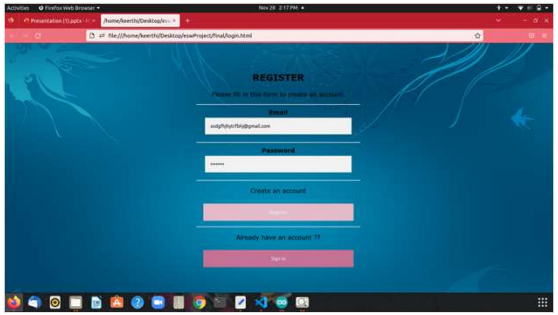
OM2M,Pushing data from Dashboard into Thingspeak and retrieving data from it

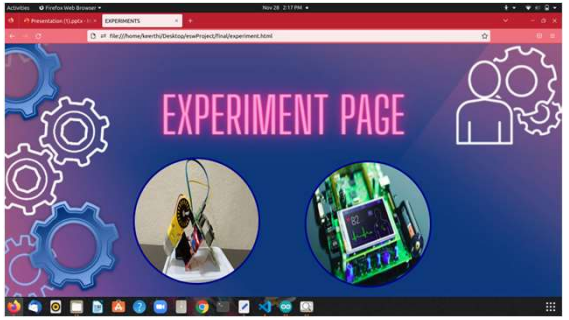
WORK DISTRIBUTION

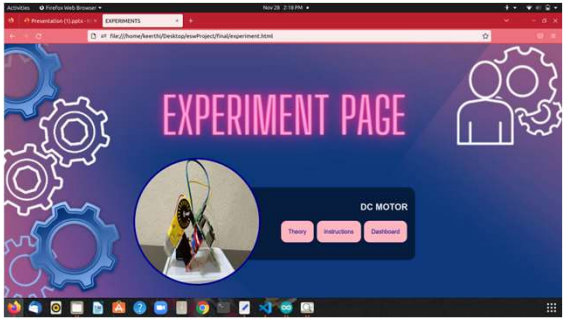
- *Keerthi-Circuit Building, Sensor interfacing(Arduino coding),Soldering*
- *Meghana-Circuit Building, video streaming, Soldering, User login*
- *Harshitha-Dashboard implementation, Thingspeak, user login*
- *Srihitha-Dashboard implementation, OM2M, User login*

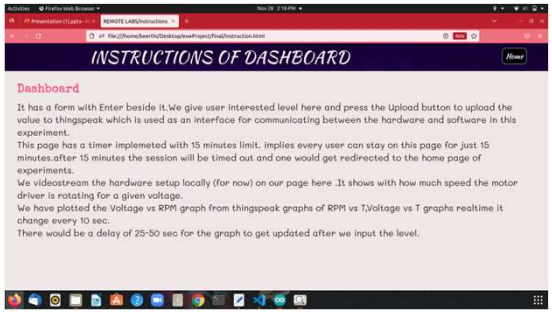
SOFTWARE

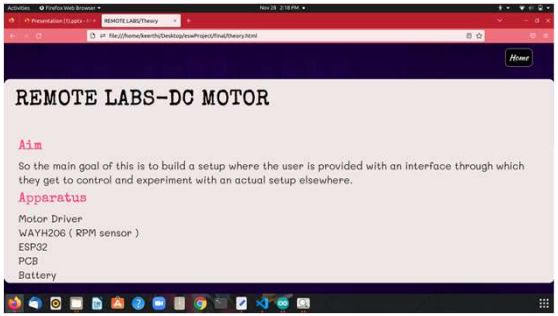
OUR DASHBOARD











SOFTWARE-FRONTEND

- Users should Register and log in to access the website.
- User will be led to a page where he can choose experiments of his choice.
- Each experiment has a theory, instruction and dashboard page.
- User has a time limit of 15min to access the dashboard.
- User can enter his desired voltages on Dashboard and analyze from the voltage vs RPM plot and the live streaming available.
- Dashboard is restricted to a single user at a time.

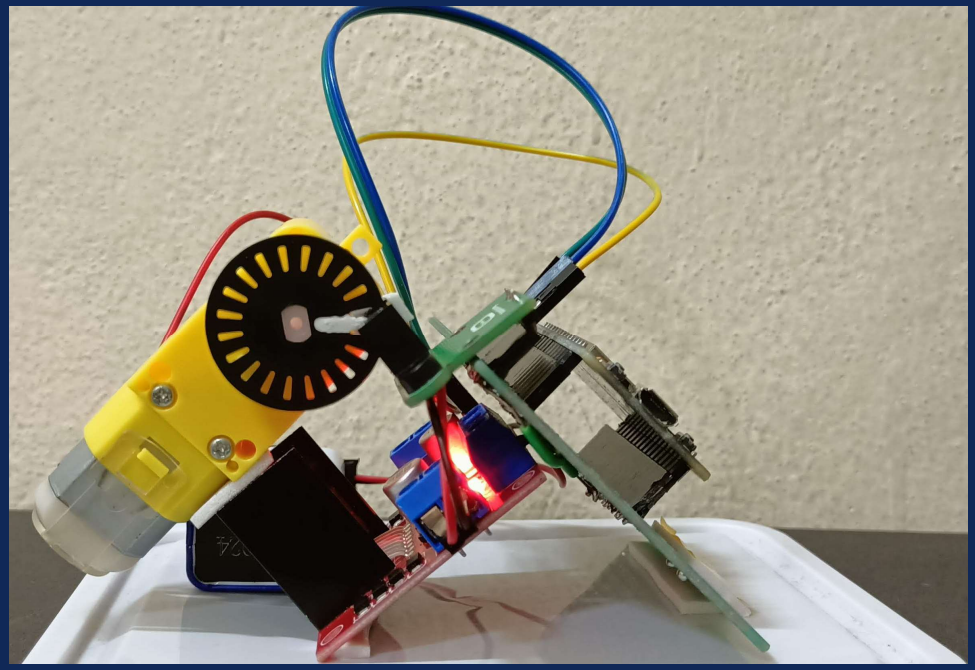
SOFTWARE-BACKEND

- Voltage entered by the user on dashboard will be uploaded to Thingspeak.
- The voltage value is then read via ESP from thinkspeak.
- Measured RPM and output voltage will be uploaded to Thingspeak and Om2m.
- We fetch data from thingspeak and plot the Voltage vs RPM graph using plotly.
- We used firebase as backend to validate the user authentication.
- Since firebase is an online Realtime database we used this for our users email storing and verification.

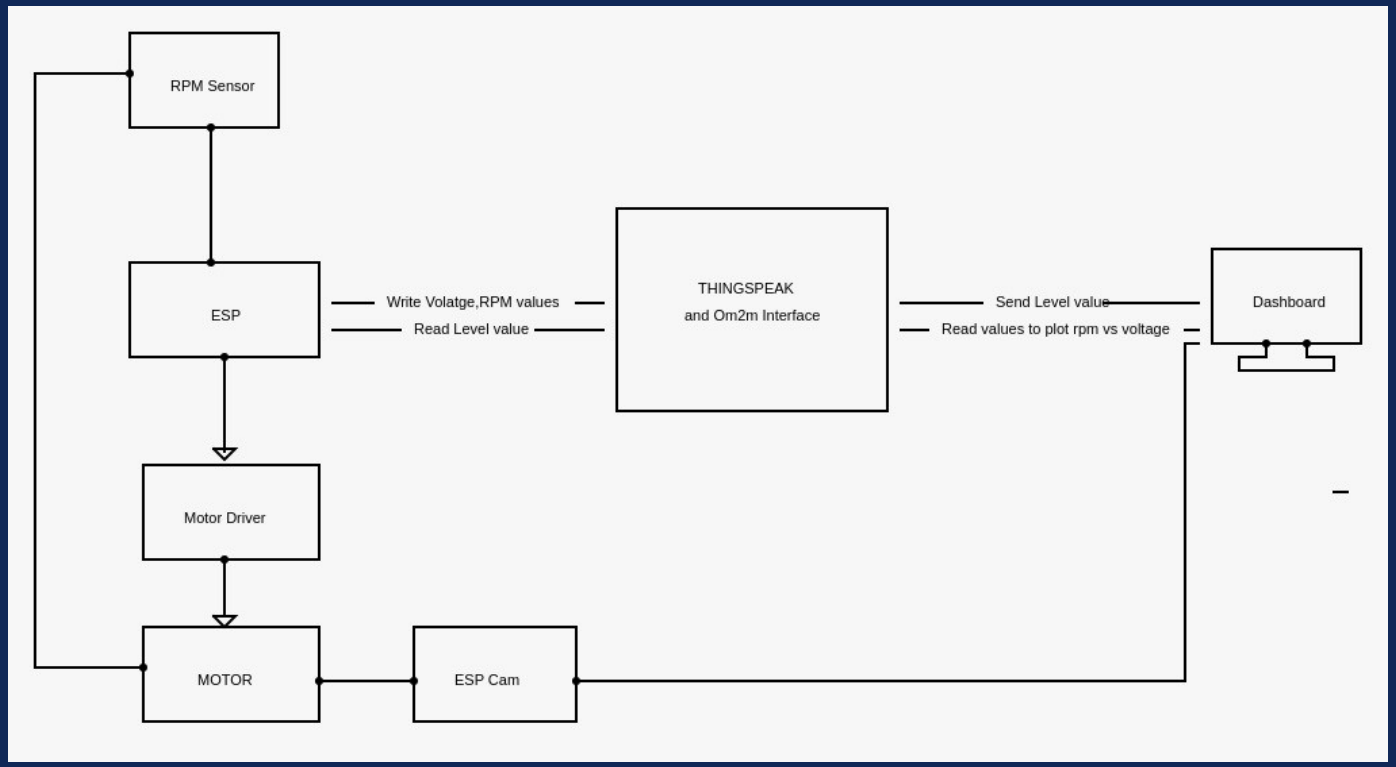
HARDWARE

HARDWARE COMPONENTS

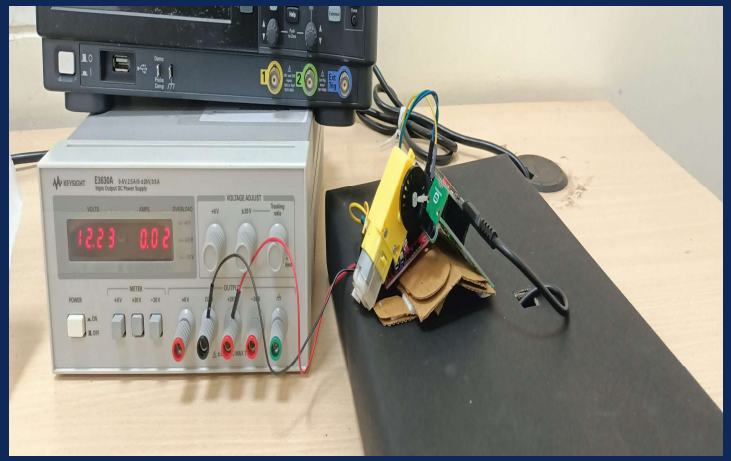
DC MOTOR	MOTOR DRIVER	IR Receiver and Transmitter	ESP32	PCB+WIRES+POWER SUPPLY

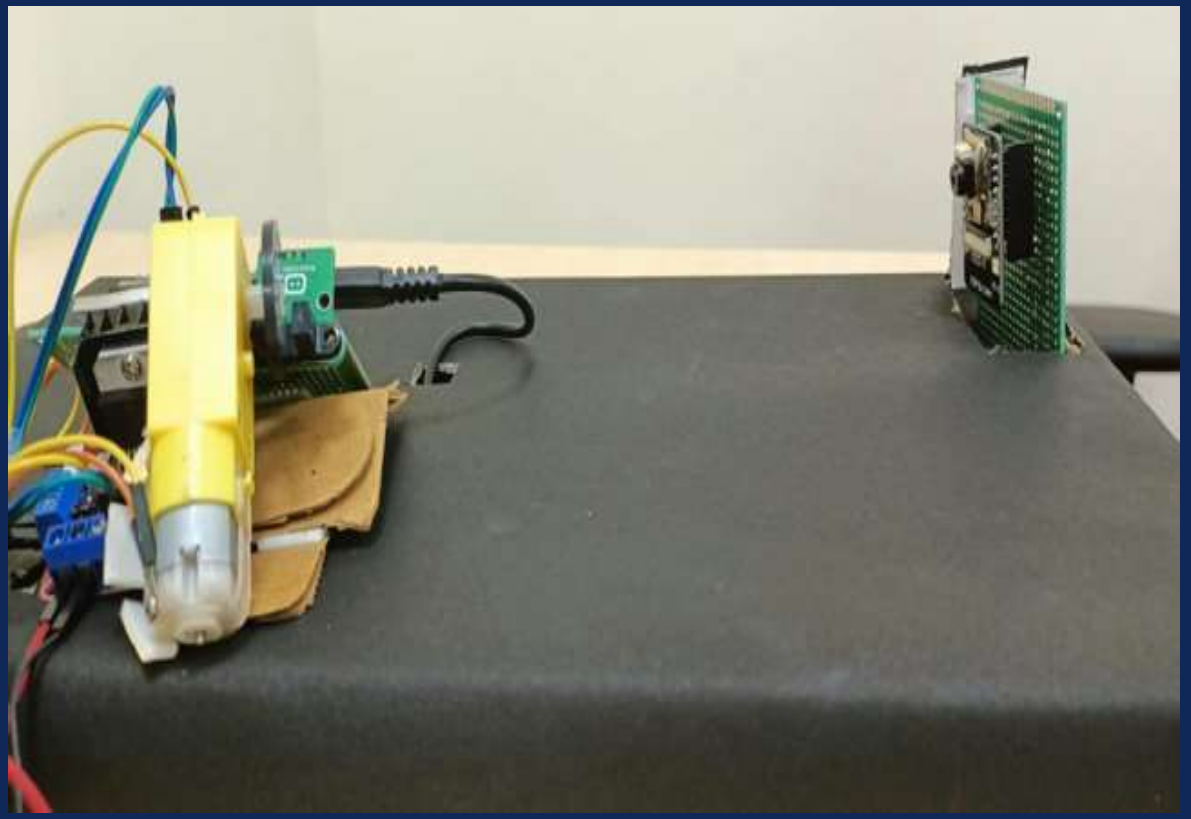


BLOCK DIAGRAM



OUR SETUP





HARDWARE

- *The user enters voltage values via dashboard.*
- *Corresponding duty cycle will be calculated using this formula,*
  - *Duty cycle = (voltage*256)/12*
- *RPM will be calculated using signal detection.*
- *Since the encoder is a slotted wheel with 20 slots, the sensor will detect 20 signal variations in one full rotation.*
- *Higher the voltage entered, greater the duty cycle which results in higher Rotations and hence RPM.*
- *User gets to analyze that voltage is proportional to RPM value.*

HARDWARE ANALYSIS

LOADING EFFECT

- *According to the principles of motor driver, it produces pulses with a given frequency as a result a major amount of voltage will be consumed and not all the voltage will be supplied to the motor.*
- *As the frequency increases, the number of pulses will increase which results in larger voltage differences. The input voltage as in, the duty cycle will be calculated on the given input which is supposed to be given as output but after the pulses, the actual voltage will be different.*
- *As a result of which, battery would drain out soon and will not suffice our requirement of providing constant voltage so, we are using power supply as it can provide a constant power supply of 12V.*
- *We have analyzed these values using multimeter and our final voltage vs RPM graph will be plotted using these estimated voltages.*

OBSERVED VOLTAGE vs FREQUENCY VALUES

Voltage / Frequency	100	80,000
1	0.6	0.06
2	3.5	0.14
3	5.5	0.2
4	6.8	0.3
5	7.6	0.4
6	8.3	2
7	8.7	4.2
8	9	6.2
9	9.4	7.5
10	9.7	9.5
11	10	10.59
12	10.4	10.62

THANK YOU