KANTIPUR ENGINEERING COLLEGE

Department of Computer and Electronics Department

A PRESENTATION FOR
MINOR PROJECT FINAL DEFENCE ON:

HOME AUTOMATION

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CONTENTS:

Introduction

HOME AUTOMATION

1. What is Home Automation?
2. Why is it needed?

PROBLEM STATEMENT

- Manual door opening and locking system
- Water overflow causes waste of water and electricity
- Gas leakage results in loss of life
- Monitoring when you are away from home

OBJECTIVES:

Implement IoT for device control using Arduino IoT cloud.

Comfort and convenience to consumers

Maintain safety in the house from fire and thief.

FEATURES

- RFID system door unlocking, Sends alert when unknown person is detected.
- Turn lights on/off according to motion detected.
- Automatically fills the tank without spillage
- Detect the presence of fire or flame an turn off the regulator and sends turns all the power supply off the kitchen
- Control home feature through IoT web and app dashboard

FEASIBILITY STUDY

Technical Feasibility

- Components easily available in the market with its datasheet
- Programming tool and software is open source.
- The component works in low voltage so there is no electrical risks.

Economical Feasibility

- Can be built in a low price as compared to the features it can provide.
- Components easily available in the market with reasonable cost.

Operational Feasibility

- The system will be well documented and easy user interfaces will be implemented for the modules. Sensors and modules easily interfaceable.
- It is user friendly and easy to use.

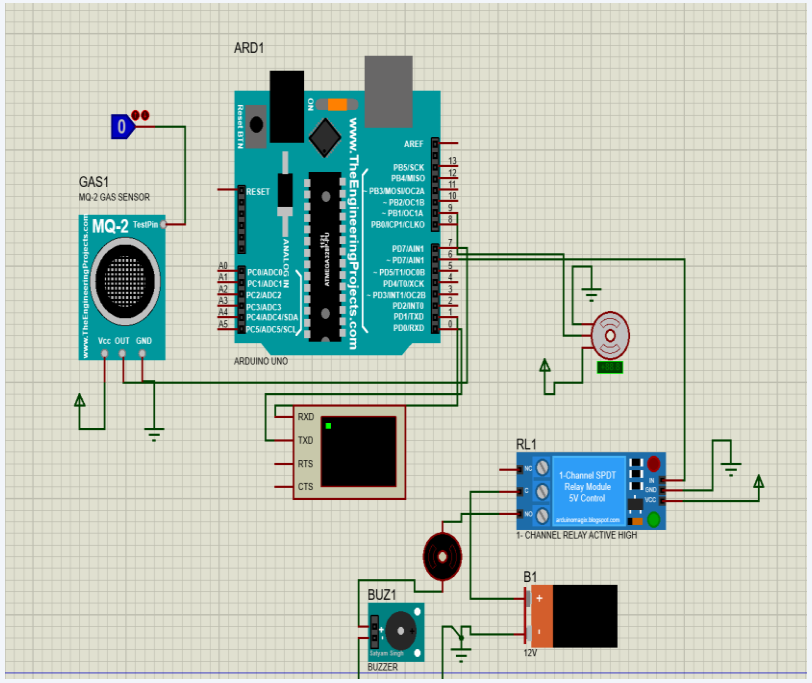
SYSTEM REQUIREMENTS

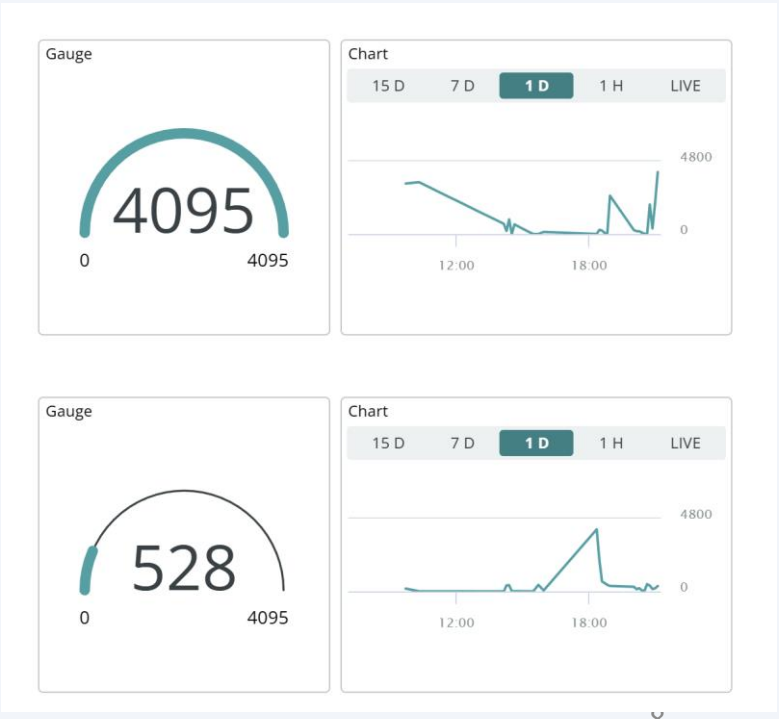
SOFTWARE REQUIREMENT

- Proteus
- Arduino software(IDE)
- Arduino IoT Cloud

```
void setup() {
  // Initialize serial and wait for port to open:
  Serial.begin(9600);
  delay(1500);


  pinMode(waterPumpRelay,    OUTPUT); // configure D2 pin as an OUTPUT
  pinMode(waterSensorSignalPin, INPUT);
  digitalWrite(waterPumpRelay, LOW); // turn the pump OF
  pinMode(mq2analogPin, INPUT);
  pinMode(fanRelay, OUTPUT);
  pinMode(buzzer, OUTPUT);
```

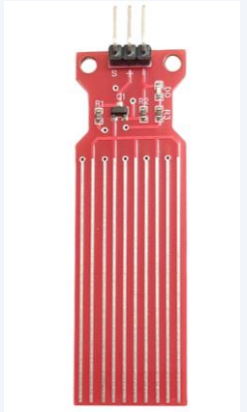


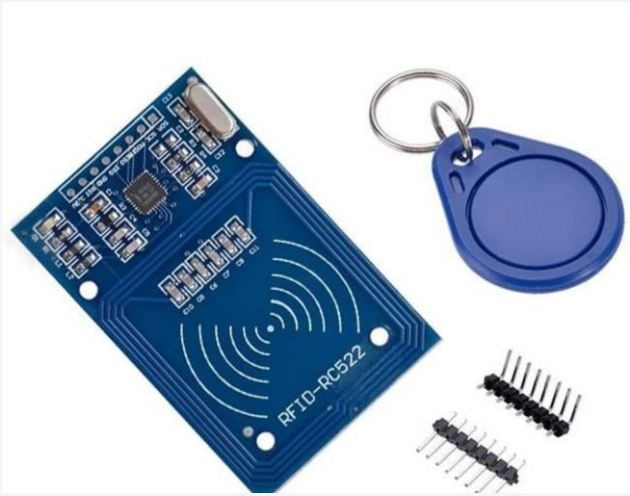


SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- ESP 32
- Servo Motors
- RFID Sensor
- LDR
- PIR Sensor
- MQ2 Sensor
- Water Pump Motor
- Water Level Sensor





LITERATURE REVIEW

1.Customary Homes to Smart Homes using Internet of Things (IoT) and Mobile Application

-Used Arduino Mega controller with Wi-Fi module for automation as base satiation and multiple Arduino Uno as remote nodes.
-Base stations functions as the central unit providing commands to remote nodes on users preferences.
-Used Light Detector Sensor, Motion Detection Sensor , Capacitive Sense Sensor and Gas sensor
-operate manually and automatic
-can be control through IoT platform ,Thingspeak
-works on both manual and automatic mode
-However, the implementation involves Arduino Mega, Uno , RF transceiver modules, and socket programming which is no user friendly interface, not affordable and modification not easy.

LITERATURE REVIEW

2.Smart Automated Home Application using IoT with Blynk App

-Used Node MCU as router gateway and link to server or cloud via Wi-Fi
-Based on temperature, fan, humidity, water level control
-Use Blynk for controlling remotely where user can create graphic interface
-Operates both on automatic and manual mode\
-provide better energy utilization and main to provide small IoT system.

3. Home Automation System Using Nodemcu (ESP8266)

-Control devices with Wi-Fi and application
-Implemented on light and fan intensity control
- using NodeMCU 8266 (open source IoT platform) for transmission and receiving and control
-Use of Blynk Platform

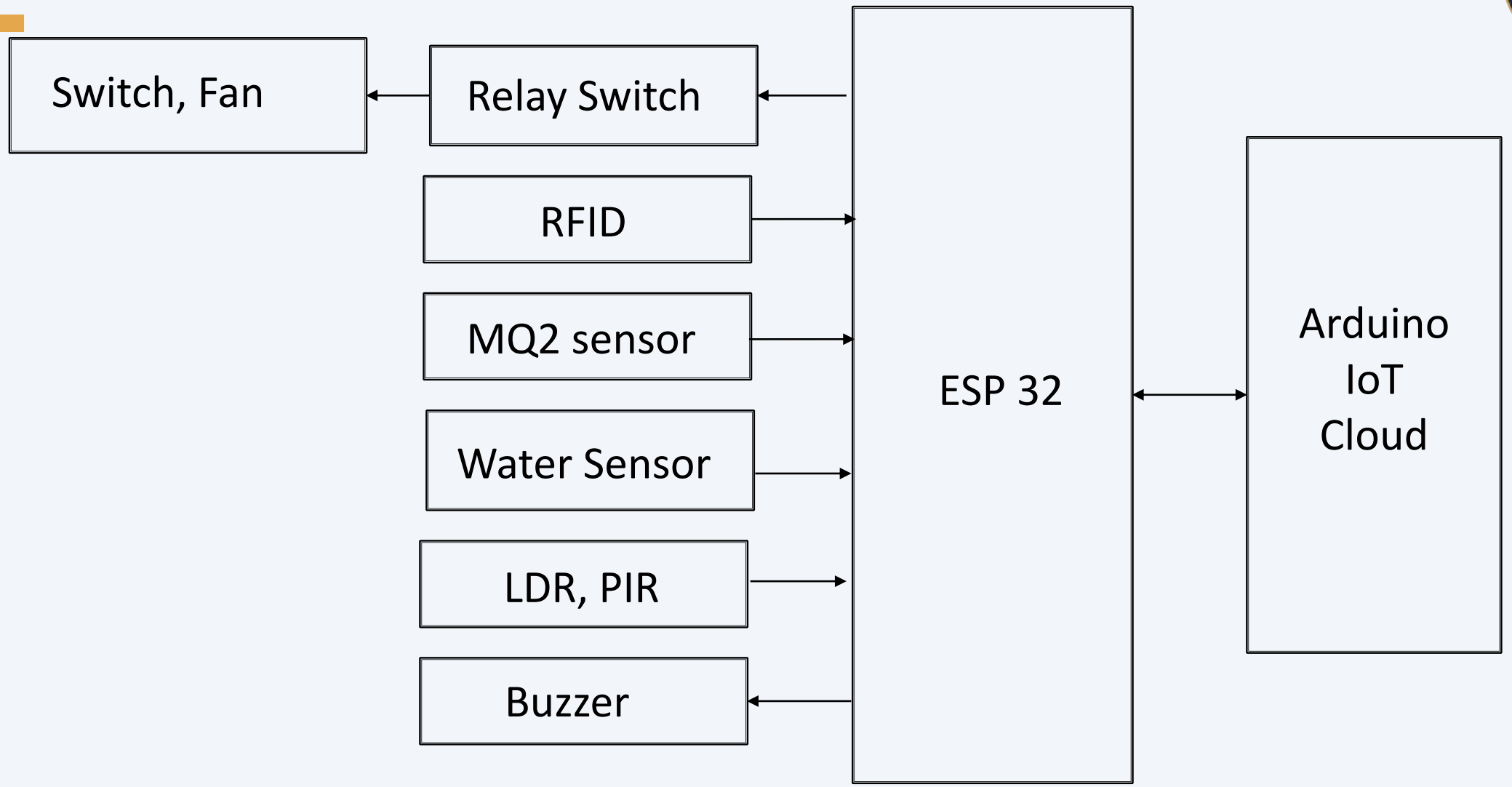
LITERATURE REVIEW

Research Gap

The existing system reveals notable research gaps to address. Some system were too complex by using many microcontrollers and some added very limited sensors just to control light and fan resulting no home security.

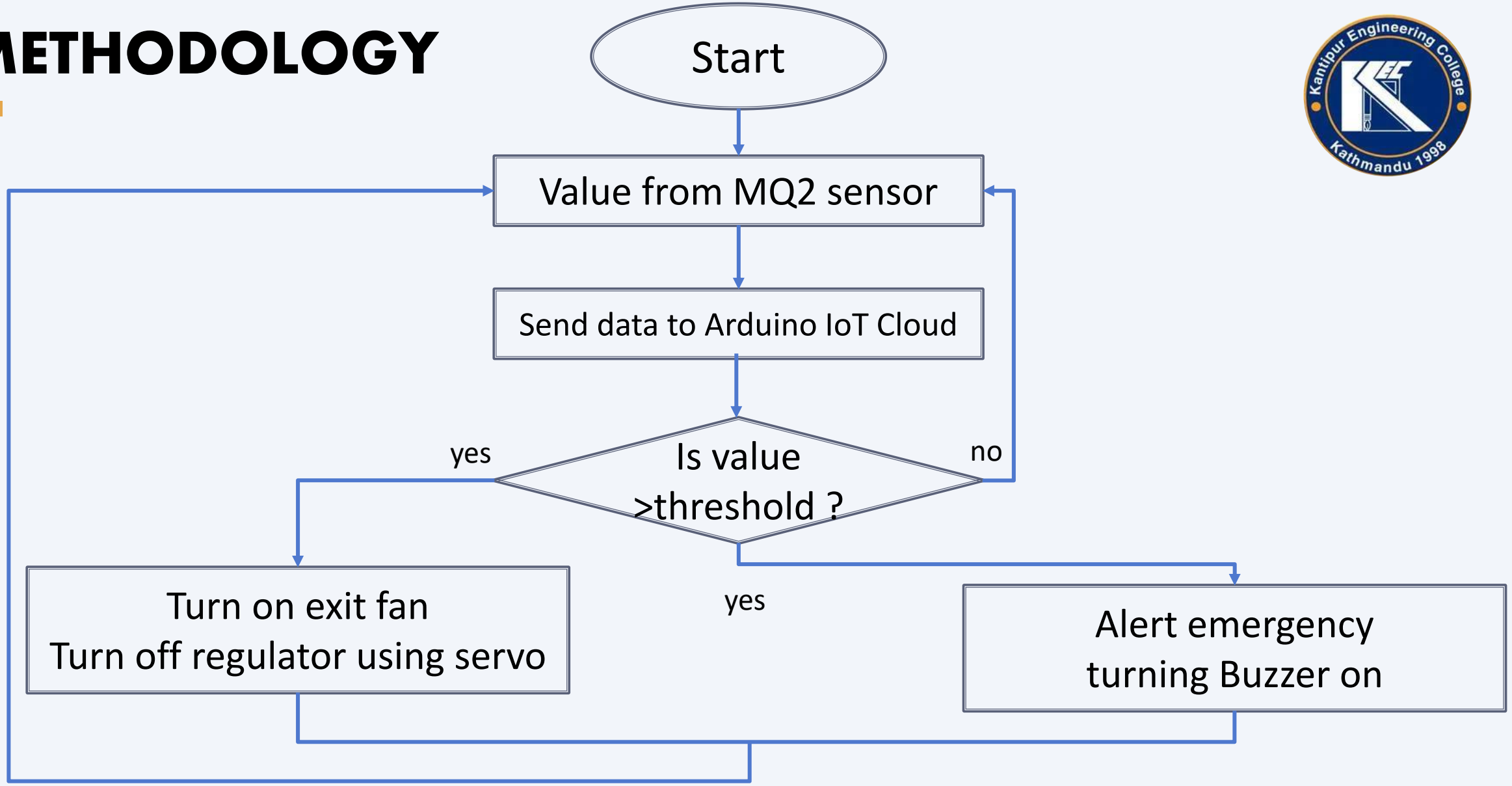
Our system address poor home security and emphasis on energy efficiency. It continuously monitor LPG in kitchen and decline unauthorized door access. It only uses one microcontroller to control entire system reducing technical complexity. It also works on comfortable and convince of user by adding up features auto tank water management and automated light in home. User can continuously control and monitor house from IoT cloud platform.

METHODOLOGY



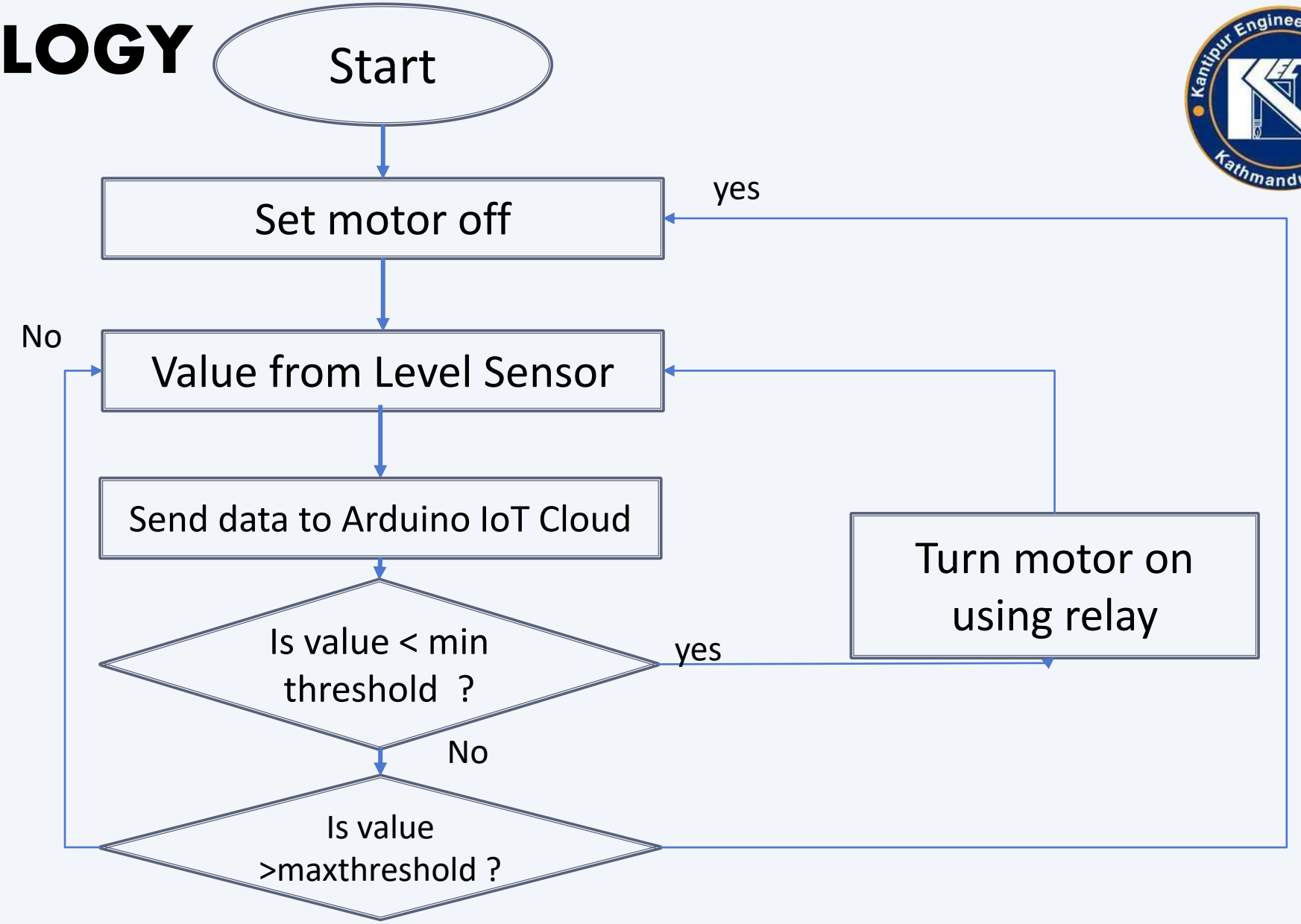
Block Diagram

METHODOLOGY



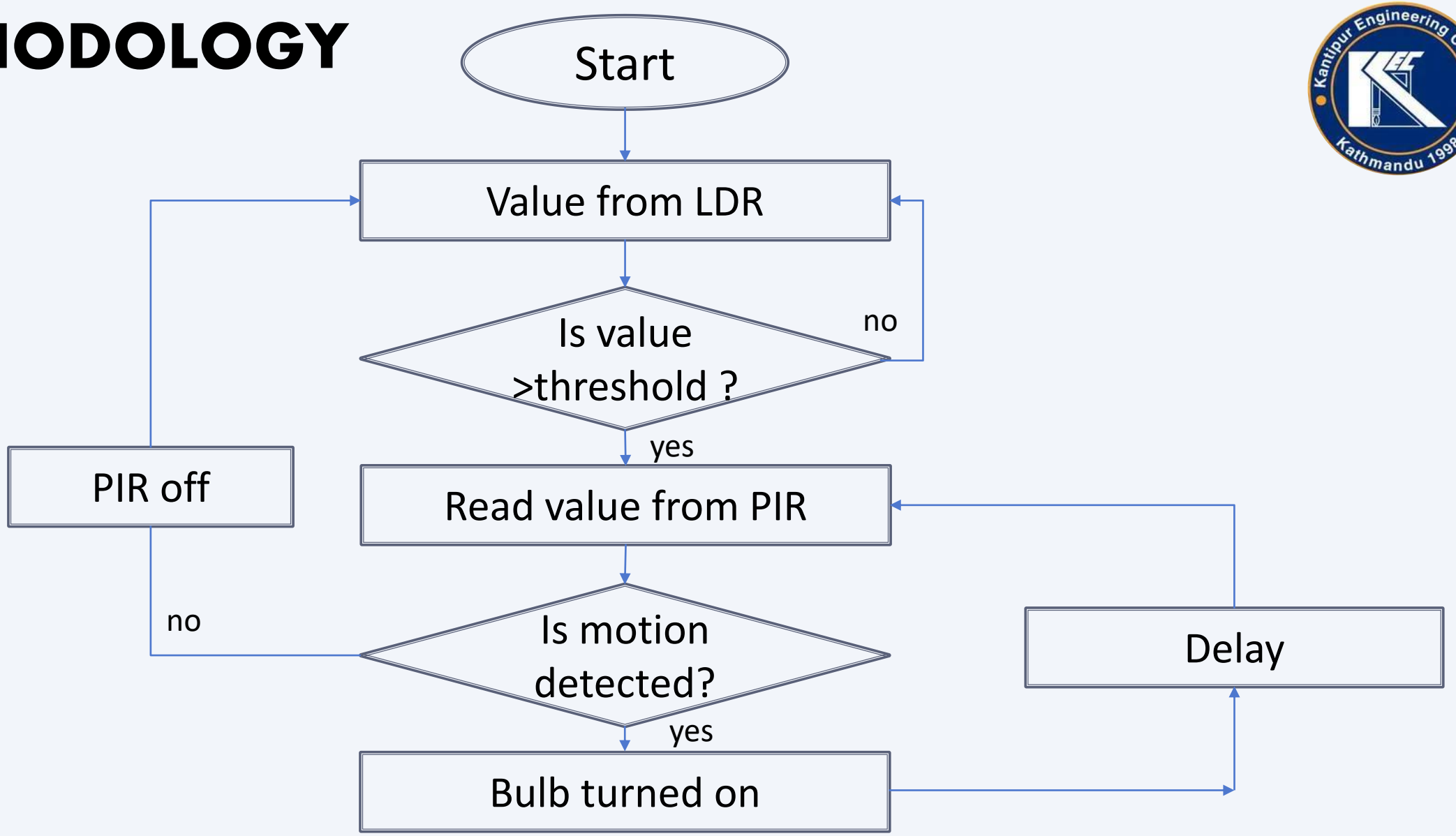
Flowchart of MQ2 gas sensor for Kitchen Fire Protection

METHODOLOGY



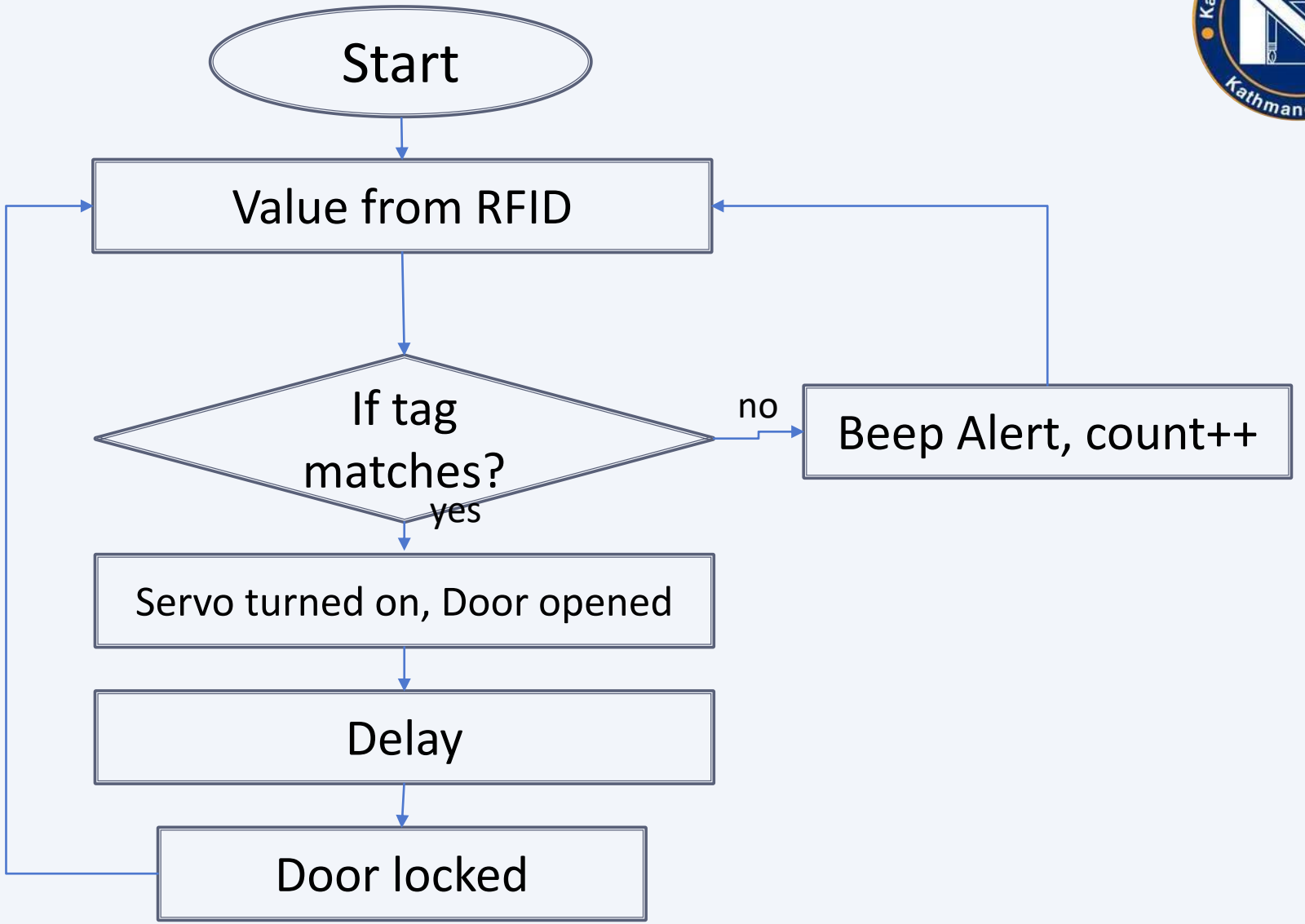
Flowchart of Water level sensor for Tank Water Management

METHODOLOGY



Flowchart PIR sensor with LDR for Light Automation

METHODOLOGY

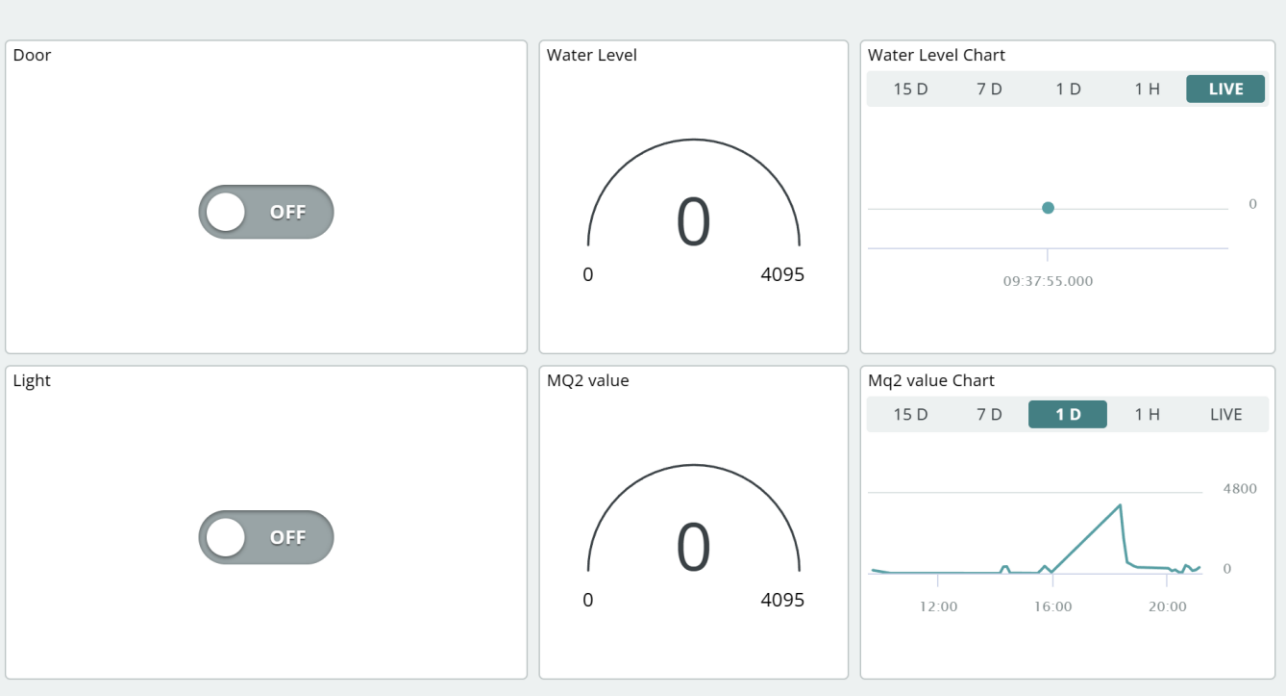


Flowchart of RFID for door automation

Result and Discussion

Output

1. Incorporated different sensors to control and monitor home appliances.
2. Connected home with internet for IoT control and monitor



Result and Discussion

Budget Analysis

Equipment	Quantity	Unit Price	Total (Rs)
ESP32	1	1250	1250
Water level sensor	1	200	200
Relay single channel	6	160	960
12V DC Fan	1	280	280
RFID-RC522 module	1	950	950
Buzzer	2	60	120
Transistor BC 547	6	10	60
Servo Motor	2	400	800
LDR	5	25	125
PIR sensor	4	300	1200
MQ2 Sensor	1	300	300
Water Pump Motor	1	200	200
Total			6445

Result and Discussion

Schedule

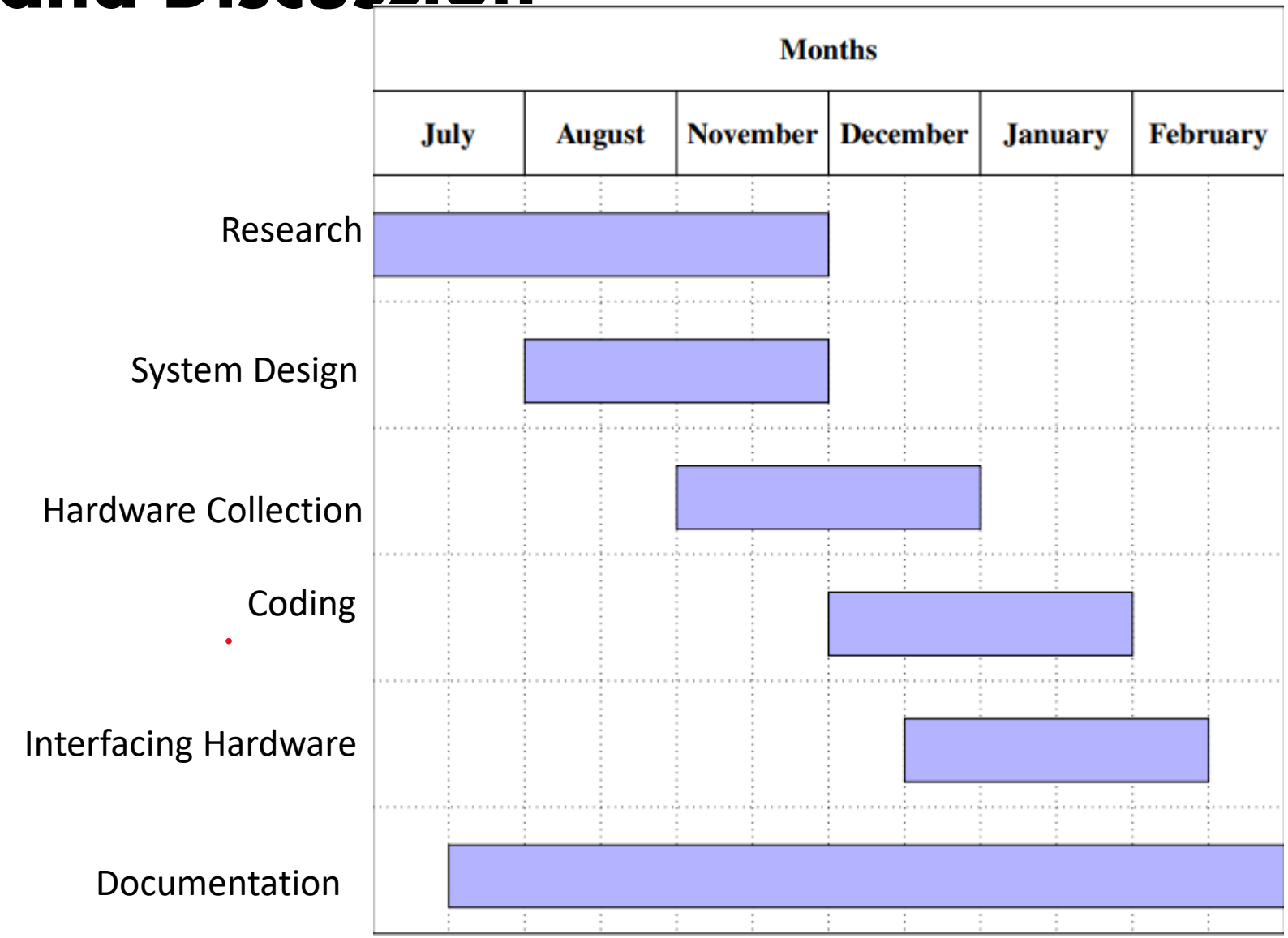


Figure 5.1: Gantt Chart

Result and Discussion

Limitations

Since the device is designed as a prototype and made using the simple electronic components, there are some limitations that are listed below:

1. This project home automation does not operate during power interruptions and totally rely on availablity of electricity.

2. The reliability of our project heavily depends on a stable and robust internet connection. Network outages or disruptions affect the functionality of IoT devices.

3. Since, water level sensor is of prototyping standard, it lacks the flexibility to adapt to various shapes and sizes of water tanks commonly installed in homes.

4. Though it is a fully automatic system, it cannot be controlled using manual switches.

Result and Discussion

Future Enhancement

Due to various factors like limited time, failure of devices, we are not able to give our full attention to all the sectors of project and concerned only towards our main objectives. When considering ways to enhance and make our home project more smart in future, there are numerous possibilities for additions:

1. **Power Backup Solutions**: Implement a power backup system, to ensure uninterrupted functionality during power outages.

2. **Smart Perimeter Security**: Integrate smart sensors along the fence and home boundary to detect unauthorized entry attempts.

3.**Versatile Water Level Sensor Design**: Develop an adaptable water level sensor that can accommodate large water tanks commonly installed in homes

THANK YOU

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