

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangama, Belagavi – 590014.



## Internship Report On

### “HOME SECURITY SYSTEM”

*Submitted in partial fulfillment of the requirement for the award of 7<sup>th</sup> semester  
of*

### BACHELOR OF ENGINEERING

In

### INFORMATION SCIENCE & ENGINEERING

AND

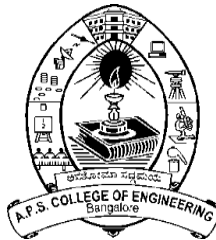
### ELECTRONICS & COMMUNICATION ENGINEERING

By

**Dhanalakshmi M**                      **1AP22EC402**

**Divya L**                                      **1AP21IS008**

**Yashaswini N P**                      **1AP21IS049**



**2024 - 2025**

**DEPARTMENT OF ISE & ECE**

## **A P S COLLEGE OF ENGINEERING**

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# Project Completion Certificate

I, **Dhanalakshmi M** (Roll No: 1AP22EC402), hereby declare that the material presented in the Project Report titled "**HOME SECURITY SYSTEM**" represents original work carried out by me in the **Department of Electronics and Communication Engineering** at the **APS college of Engineering, Bangalore** during the tenure **2 October, 2024 – 12, December, 2024**.

With My signature, I certify that:

- I have not manipulated any of the data or results.
- I have not committed any plagiarism of intellectual property and have clearly indicated and referenced the contributions of others.
- I have explicitly acknowledged all collaborative research and discussions.
- I understand that any false claim will result in severe disciplinary action.
- I understand that the work may be screened for any form of academic misconduct.

**Date:**

**Student Signature:**

---

In my capacity as the supervisor of the above-mentioned work, I certify that the work presented in this report was carried out under my supervision and is worthy of consideration for the requirements of the B.Tech. Internship Work.

**Advisor's Name:**

**Guide Name: AKHIL SAI**

**Advisor's Signature**

**Guide Signature**

# Project Completion Certificate

I, **Divya L** (Roll No: 1AP21IS008), hereby declare that the material presented in the Project Report titled "**HOME SECURITY SYSTEM**" represents original work carried out by me in the **Department of Information Science and Engineering** at the **APS college of Engineering, Bangalore** during the tenure **2 October, 2024 – 12, December, 2024**.

With My signature, I certify that:

- I have not manipulated any of the data or results.
- I have not committed any plagiarism of intellectual property and have clearly indicated and referenced the contributions of others.
- I have explicitly acknowledged all collaborative research and discussions.
- I understand that any false claim will result in severe disciplinary action.
- I understand that the work may be screened for any form of academic misconduct.

**Date:**

**Student Signature:**

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In my capacity as the supervisor of the above-mentioned work, I certify that the work presented in this report was carried out under my supervision and is worthy of consideration for the requirements of the B.Tech. Internship Work.

**Advisor's Name:**

**Guide Name: AKHIL SAI**

**Advisor's Signature**

**Guide Signature**

# Project Completion Certificate

I, **Yashaswini N P** (Roll No: 1AP21IS049), hereby declare that the material presented in the Project Report titled "**HOME SECURITY SYSTEM**" represents original work carried out by me in the **Department of Information Science and Engineering** at the **APS college of Engineering, Bangalore** during the tenure **2 October, 2024 – 12, December, 2024**.

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- I have not manipulated any of the data or results.
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**Date:**

**Student Signature:**

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In my capacity as the supervisor of the above-mentioned work, I certify that the work presented in this report was carried out under my supervision and is worthy of consideration for the requirements of the B.Tech. Internship Work.

**Advisor's Name:**

**Guide Name: AKHIL SAI**

**Advisor's Signature**

**Guide Signature**

# Evaluation Sheet

**Title of the Project: HOME SECURITY SYSTEM**

**Name of the Students:**

**DHANALAKSHMI M (1AP22EC402)**

**DIVYA L (1AP21IS008)**

**YASHASWINI N P (1AP21IS049)**

**External Supervisor:**

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**Internal Supervisor:**

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**Date:**

**Place:**

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## **ABSTRACT**

The Home Security System project will focus on creating a reliable and efficient system to address the pressing needs of modern households. This system will incorporate advanced technologies such as Raspberry Pi, DHT11 sensors, and PIR sensors to provide a comprehensive solution for Environment Monitoring and Theft Protection.

It will monitor environmental parameters such as temperature and humidity to ensure optimal living conditions while simultaneously detecting unauthorized movements to protect the premises from theft.

The environment monitoring aspect of the system will allow homeowners to track temperature and humidity levels in real time through an intuitive user interface. This data will help maintain a comfortable and safe indoor environment while also enabling early detection of abnormal conditions. On the other hand, the theft protection functionality will use motion detection to trigger alarms and send notifications, ensuring quick action in the event of suspicious activity.

The project will adopt a modular and scalable design to allow future integrations, such as cloud connectivity for storing historical environmental data and mobile app development for remote monitoring. Additionally, artificial intelligence capabilities could be introduced to analyze environmental trends and provide predictive insights.

This Home Security System will serve as a user-friendly, cost-effective solution designed to enhance both safety and convenience for homeowners. By automating critical security and environmental monitoring tasks, it will reduce manual intervention and ensure peace of mind for users. Future iterations of the system will aim to incorporate smart technologies to further improve functionality and user experience.

# CHAPTER 1

## INTRODUCTION

### 1.1 Objective

- To monitor and maintain environmental conditions like temperature and humidity.
- To safeguard homes from unauthorized access and theft.
- To provide real-time alerts for immediate action.

### 1.2 Problem Statement

Current home security systems often lack integrated solutions that monitor both environmental conditions and theft protection.

Key issues include:

1. The absence of automated theft detection systems in many residential areas.
2. Lack of real-time monitoring and notifications for environmental parameters.
3. The need for a cost-effective and user-friendly integrated solution.

This project seeks to address these challenges by developing a comprehensive and reliable system.



## CHAPTER 2

### APPLICATIONS

1. **Real-Time Environmental Monitoring:** Monitors temperature, humidity, and air quality for better indoor environmental management.
2. **Theft Detection:** Uses ultrasonic sensors to detect unauthorized movement or intrusion.
3. **Gas Leak Detection:** Alerts users when harmful gas levels exceed a safe threshold.
4. **Remote Data Monitoring:** Logs sensor readings to ThinkSpeak for real-time remote access and analysis.
5. **Image Capture for Evidence:** Captures and stores images locally when objects are detected in close proximity.
6. **Alert System:** Triggers a buzzer and LED to provide immediate audible and visual alerts.
7. **Home Automation:** Can integrate with smart devices for enhanced home automation capabilities.
8. **Safety Assurance:** Provides a reliable and automated system for ensuring personal and property safety.

## CHAPTER 3

# COMPONENTS

1. **Flask Web Framework**- Handles image uploads and communication between the system and remote servers.
2. **Camera Module**- Captures images upon detecting an intrusion, which are saved and sent to a server for further action.
3. **Raspberry Pi** –



Acts as the control unit for data Processing and integration. A low-cost, single-board computer, often used in DIY projects. It provides computing power for running the system's software, interfacing with sensors, and managing the display. It is typically powered via a 5V micro-USB power supply.

4. **Adafruit DHT11 Sensor** –



Measures temperature and humidity. A basic temperature and humidity sensor that provides accurate readings for indoor air quality monitoring. It uses a digital signal to provide temperature (°C) and humidity (%) data, which is crucial for assessing environmental comfort.

## 5. MQ135 Sensor –



Detects air pollutants such as carbon dioxide and ammonia. A semiconductor-based sensor designed to detect harmful gases like ammonia, carbon dioxide, benzene, and smoke. It is ideal for air quality monitoring as it provides an analog output related to gas concentrations, allowing the system to detect pollution levels.

## 6. Buzzer –



Alerts users to hazardous pollutant levels. A simple electronic device used for alerting users when air quality parameters exceed predefined unsafe levels. The buzzer emits a sound when pollutant levels go beyond threshold limits, drawing attention to hazardous conditions.

## 7. Power Supply –



Powers the Raspberry Pi and sensors. A 5V DC adapter (or a portable power bank) is used to supply power to the Raspberry Pi and its peripherals. It ensures stable power for continuous monitoring and operation of all connected devices.

## 8. Connecting Wires –



Facilitates connections between hardware components. wires are flexible strands of metal, typically copper, used to establish electrical conductivity between different components in an electronic circuit, allowing electric current to flow from one point to another.

## 9. LED-



The LEDs act as visual indicators for the system's status or alerts. They light up to signify specific conditions, such as proximity detection, system activity, or smoke level warnings. By providing immediate and clear visual cues, LEDs enhance user awareness and complement the auditory alerts from the buzzer.

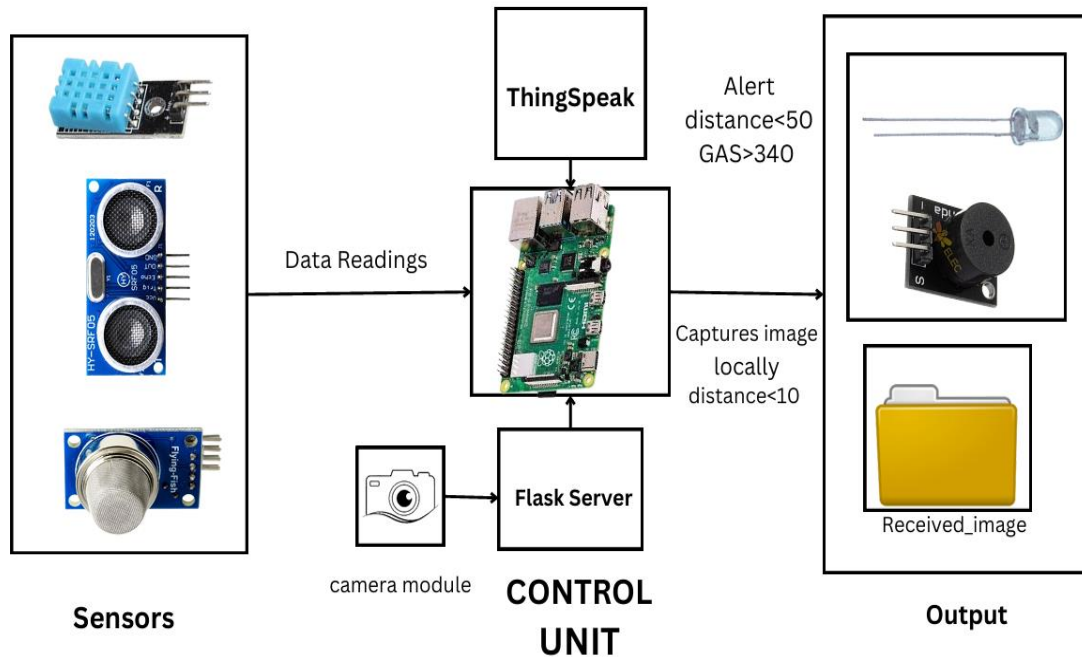
## 10. Ultrasonic Sensors-



The Ultrasonic Sensor is used to measure the distance to nearby objects. It emits ultrasonic waves and calculates the time taken for the echo to return, providing accurate distance measurements. It helps detect proximity for alert purposes.

## CHAPTER 4

### FLOWCHART



The flowchart depicts the workflow of the Home Security System integrating sensors, a control unit, and output mechanisms. The sensors like DHT11 for temperature and humidity, an ultrasonic sensor for detecting nearby objects, and a gas sensor for air quality which sends data to the control unit. The ThingSpeak platform processes and logs this data for real-time monitoring, while the Flask server handles local image capture when objects are detected at very close range (<10 cm). Alerts are triggered using a buzzer and LED if gas levels exceed a threshold or objects are detected within 50 cm. This system ensures effective theft protection and environmental monitoring through real-time alerts and data logging.

## CHAPTER 5

### CONCLUSION

The Home Security System project successfully integrated various components to monitor environmental conditions and protect against theft. The system utilized sensors like the DHT11 for temperature and humidity, an ultrasonic sensor for distance measurement, and a gas sensor for detecting harmful gases. Alerts were effectively triggered using a buzzer and LED, providing both visual and auditory notifications. The system sent real-time data to ThingSpeak, ensuring continuous monitoring. The integration of a Flask-based web server allowed the system to receive images remotely, enhancing security measures. Overall, the project met its objectives and demonstrated the potential for enhancing security through automation and real-time monitoring.

## CHAPTER 6

### FUTURE WORK

1. Integration with Smart Home Systems: The system could be further developed to integrate with popular smart home platforms like Alexa or Google Home, enabling voice-controlled monitoring and alerts.
2. Enhanced Object Recognition: Implementing advanced computer vision techniques for better object detection and recognition, allowing the system to differentiate between intruders and non-threatening objects.
3. Cloud Storage for Data: Implementing cloud-based storage for sensor data and images, enabling long-term data analysis and improving the scalability of the system for multiple locations.

## CHAPTER 7

### APPENDIX

#### 7.1 PSEUDO CODE

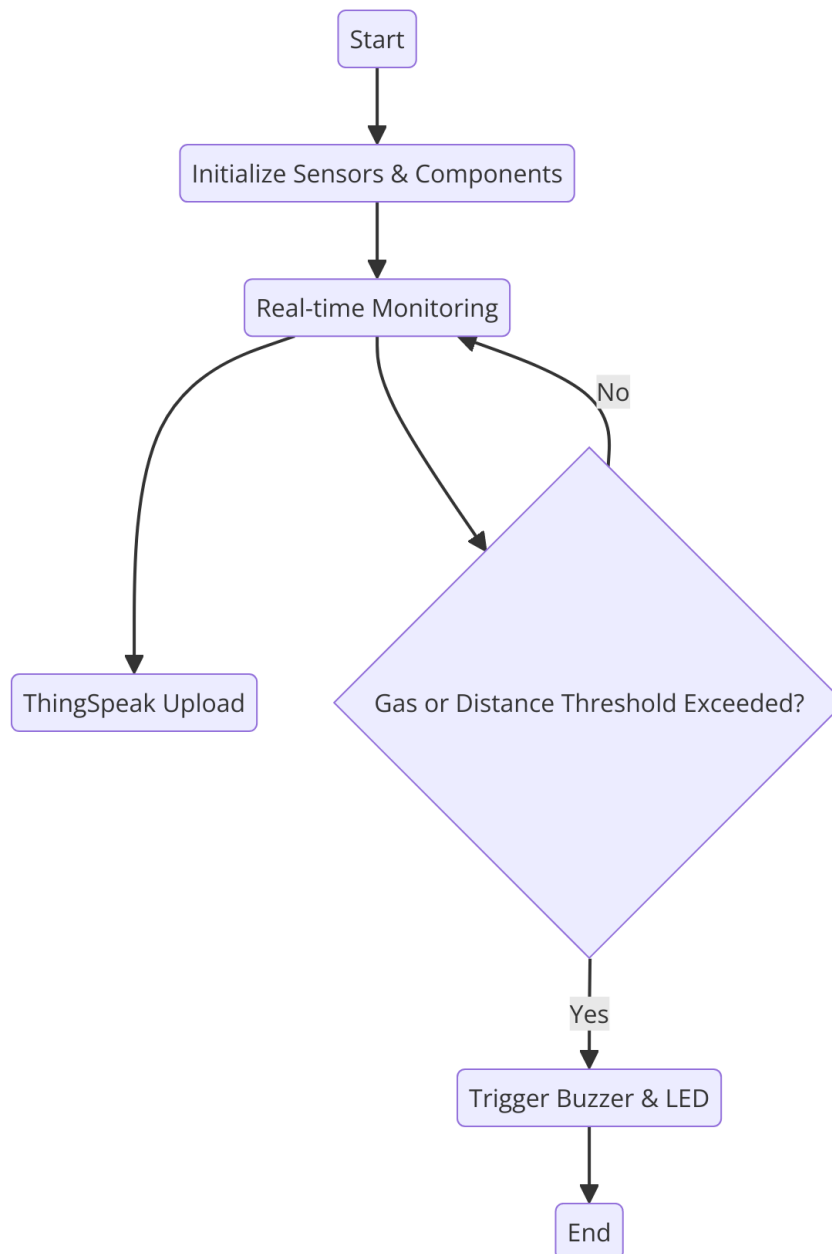


Figure 1 Environmental monitoring



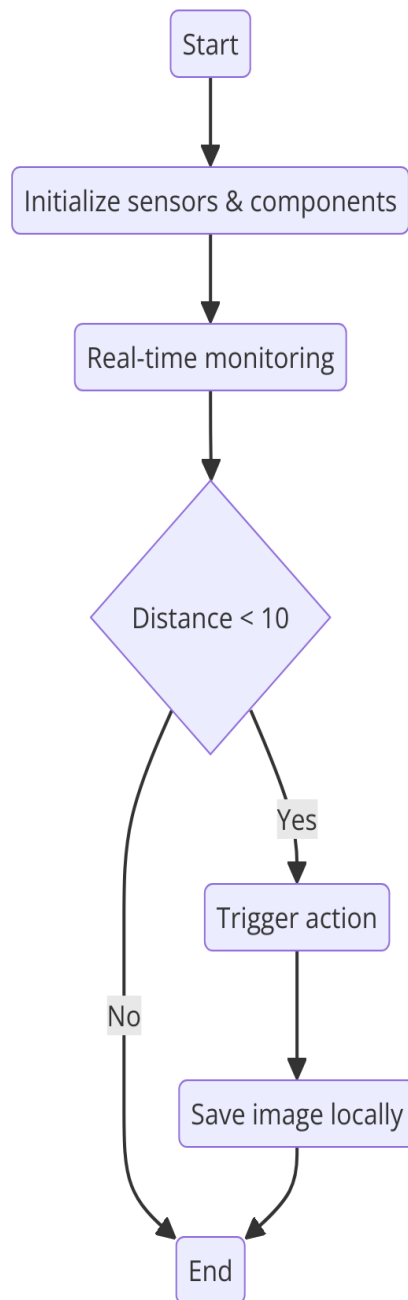


Figure 2 Theft monitoring