INTRUDER DETECTION SECURITY MONITORING USING IOT

## PROJECT REPORT

***Submitted by***

# KISHORE KUMAR J

**Register No: 711522MMC022**

*In partial fulfilment for the award of the degree*

*Of*

# MASTER OF COMPUTER APPLICATIONS

## ANNA UNIVERSITY, CHENNAI.

*Under the supervision and guidance*

*Of*

**Ms. M. UMAMAHESWARI MCA., (Ph.D).,**

**Assistant Professor Department of Computer Applications**

**KIT -KALAIGNARKARUNANIDHI INSTITUTE OF TECHNOLOGY**

**An Autonomous Institution**

**Accredited with ‘A’ Grade by NAAC & NBA**

**COIMBATORE-641402**

**JUNE- 2024**

# KIT -KALAIGNARKARUNANIDHI INSTITUTE OF TECHNOLOGY

## An Autonomous Institution Accredited with ‘A’ Grade by NAAC & NBA

**COIMBATORE – 641402.**

## DEPARTMENT OF COMPUTER APPLICATIONS M20CAP401- PROJECT WORK

This is to certify that the project work entitled

# INTRUDER DETECTION SECURITY MONITORINGUSING IOT

Is the bonafide record of project work done by

## KISHORE KUMAR J

**Register No: 711522MMC022**

*of*

**MASTER OF COMPUTER APPLICATIONS**

During the year 2023-2024

## Project Guide Head of the Department

Submitted for the Project Viva – Voce examination held on .

Internal Examiner External Examiner

# DECLARATION

I affirm that the project work titled **“INTRUDER DETECTION SECURITY MONITORING USING IOT”** is the original work of **Mr. J. KISHORE KUMAR (Reg.No.711522MMC022)** being submitted in partial fulfilment for the award of **MASTER OF COMPUTER APPLICATIONS**. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation work submitted for award of any degree or diploma, either in this or any other university on earlier occasion by me or any other candidates.

(Signature of the Candidate)

**KISHORE KUMAR J Reg.No.711522MMC022**

I certify that the declaration made above by the candidate is true, to my knowledge.

**Signature of the Guide**

**Ms. M. UMAMAHESWARI MCA., (Ph.D).,**

**Assistant Professor & Project Guide, Master of Computer Applications**

## ABSTRACT

Intruder detection and security monitoring using IoT is an emerging technology that offers a cost-effective and efficient solution for detecting intruders in a given area and alerting the concerned authorities. This system uses various sensors, such as PIR motion sensors, door sensors, and window sensors, which are connected to a microcontroller, such as Arduino. The microcontroller processes the signals from the sensors and triggers an alarm or sends a notification to the authorized person. The system has been tested and evaluated, and the results show that it provides an effective way to secure the premises and protect against any unauthorized access or intrusion. The system can be used in various applications, such as home security, office security, and industrial security. Traditional intruder detection systems often suffer from limitations that hinder their effectiveness in providing reliable security measures. One common drawback is their limited precision, primarily relying on motion sensors that may fail to accurately determine the precise location and direction of intruder movement.

This often leads to false alarms or delayed responses, diminishing the system's reliability. Additionally, conventional systems typically lack the ability to distinguish between authorized individuals and intruders, resulting in frequent false alarms triggered by harmless movements or legitimate personnel. Manual camera adjustment in fixed- camera systems also poses challenges, requiring constant monitoring and adjustment to prevent blind spots or missed intrusions.. By integrating IR sensors and a servo motor, our system enhances precision by accurately detecting the direction of intruder movement and automatically adjusting the camera's orientation to focus on the intruder's location. Furthermore, the integration of facial recognition technology enables our system to differentiate between authorized individuals and potential intruders, minimizing false alarms triggered by legitimate personnel while accurately identifying unauthorized intrusions. The inclusion of an Arduino microcontroller facilitates remote alerting, allowing instant notifications via SMS messages or phone calls to pre-registered mobile numbers in the event of an intrusion, irrespective of the user's location. Additionally, the automatic camera adjustment feature eliminates the need for manual intervention, ensuring continuous and thorough surveillance without the risk of blind spots or missed intrusion.

# ACKNOWLEDGEMENT

The success of any project is the co-operative effort of the people around an individual. For all efforts, project, I am highly intended to the following personalities without whom this project would ever be completed.

At the outset, I would like to thank our Founder and Chairman **Thiru. PONGALUR**

**N. PALANISAMY, KIT-Kalaignarkarunanidhi Institute of Technology,** who has given me an opportunity to undergo this Project Work, successfully in this esteemed Institution.

I express my sincere thanks to **Mrs. P. INDU MURUGESAN, Vice Chairperson**, **KIT-Kalaignarkarunanidhi Institute of Technology,** who encouraged me by giving her support and constant encouragement.

I extend my grateful thanks and wishes to **Dr. N. MOHANDAS GANDHI, ME., MBA., Ph.D., CEO, KIT- Kalaignarkarunanidhi Institute of Technology,** for the valuable suggestion in framing my carrier towards the fulfillment of this Project work.

I express my sincere thanks to **Dr. M. RAMESH, ME., Ph.D., Principal, KIT- Kalaignarkarunanidhi Institute of Technology,** who encouraged me by giving his valuable suggestion and constant encouragement.

I would like to acknowledge the respective **Dr. E. VIJAYAKUMAR MCA., Ph.D., Associate Professor & Head, Department of Computer Applications, KIT- Kalaignarkarunanidhi Institute of Technology,** for spending the valuable time in guiding and supporting me to make this project a successful one.

I take the privilege to extend my hearty thanks to our project Coordinator and my internal guide **Ms. M. UMAMAHESWARI MCA., (Ph.D)., Assistant Professor & Project Guide, Department of Computer Applications f**or spending her valuable time and energy in guiding, supporting and helping me in preparation of the project.

I am greatly indebted to thank the faculty members, Department of Computer Applications, who have extended a remarkable support to complete my report. I extend my gratitude for the encouragement that I received from my family for the unconditional love in supporting my quest for knowledge.

# TABLE OF CONTENTS

|  |  |  |
| --- | --- | --- |
| **CHAPTER NO** | **TITLE** | **PAGE NO** |
|  |  |  |
|  | **LIST OF FIGURES** |  |
| **1.** | **INTRODUCTION** |  |
|  | 1.1 About the Project | 1 |
| **2.** | **SYSTEM ANALYSIS** |  |
|  | 2.1 Existing System | 2 |
|  | 2.1.1 Disadvantages | 2 |
|  | 2.2 Proposed System | 3 |
|  | 2.2.1 Advantages | 3 |
| **3.** | **SYSTEM SPECIFICATION** |  |
|  | 3.1 Hardware Requirements | 4 |
|  | 3.2 Software Requirements | 4 |
| **4.** | **SOFTWARE DESCRIPTION** |  |
|  | 4.1 Arduino IDE | 5 |
|  | 4.1.1 Python IDLE | 6 |
|  | 4.1.2 Embedded C Language | 7 |
|  | 4.2 Hardware Description | 8 |
|  | 4.2.1 NodeMCU 8266 | 9 |
|  | 4.2.2 ESP32-CAM | 12 |
|  | 4.2.3 GSM | 16 |

|  |  |  |
| --- | --- | --- |
|  | 4.2.4 IR Sensor | 18 |
|  | 4.2.5 Buzzer | 20 |
|  | 4.2.6 Servo Motor | 22 |
|  | 4.2.7 Power Supply | 24 |
|  | 4.2.8 Arduino UNO Display | 27 |
|  | 4.2.9 LCD Display | 29 |
| **5.** | **PROJECT DESCRIPTION** |  |
|  | 5.1 Modules | 31 |
|  | 5.1.1 Intruder Identification | 31 |
|  | 5.1.2 Intruder MovementDetection | 32 |
|  | 5.1.3 Alert Notification | 32 |
|  | 5.1.4 Alarming the Environment | 33 |
|  | 5.1.5 Block Diagram | 33 |
| **6.** | **SYSTEM TESTING** |  |
|  | 6.1 Test Strategies | 35 |
|  | 6.1.1 Unit Testing | 35 |
|  | 6.1.2 Integration Testing | 36 |
|  | 6.1.3 System Testing | 36 |
|  | 6.1.4 White Box Testing | 36 |
|  | 6.1.5 Black Box Testing | 36 |
| **7.** | **SYSTEM IMPLEMENTATION** |  |
|  | 7.1 System Maintenance | 37 |
| 7.2 System Implementation | 37 |
| 7.3 Implementation Procedures | 38 |

|  |  |  |
| --- | --- | --- |
| **8.** | **CONCLUSION & FUTURE ENHANCEMENT** | |
|  | 8.1 Conclusion | 39 |
|  | 8.2 Future Enhancement | 39 |

|  |  |  |
| --- | --- | --- |
| **9.** | **APPENDIX** |  |
|  | 9.1 Source Code | 41 |
|  | 9.2 Screenshots | 49 |
| **10.** | **REFERENCES** |  |
|  | 10.1 Book References | 54 |
|  | 10.2 Web References | 55 |

# LIST OF FIGURES

|  |  |  |
| --- | --- | --- |
| **FIGURE NO** | **FIGURE NAME** | **PAGE NO** |
| 4.1 | Arduino Icon | 5 |
| 4.2 | NodeMCU 8266 | 9 |
| 4.3 | ESP32-CAM | 12 |
| 4.4 | ESP32-CAM Circuit Diagram | 13 |
| 4.5 | GSM | 16 |
| 4.6 | IR Sensor | 18 |
| 4.7 | Buzzer | 20 |
| 4.8 | Servo Motor | 22 |
| 4.9 | Arduino UNO | 27 |
| 4.10 | LCD Display | 29 |
| 5.1 | Block Diagram | 34 |
| 9.1 | Face Detection | 49 |
| 9.2 | Training the Data to the System | 50 |
| 9.3 | Unknown Person Face Detection | 50 |
| 9.4 | For Intruder Movement Detection | 51 |
| 9.5 | Hardware Connection | 52 |
| 9.6 | Live Streaming | 52 |
| 9.7 | Emergency Phone Call | 53 |
| 9.8 | Message Notification | 53 |