M.KUMARASAMY
COLLEGE OF ENGINEERING
NAAC Accredited Autonomous Institution
Approved by AICTE & Affiliated to Anna University
ISO 9001:2015 Certified Institution
Thalavapalayam, Karur – 639 113.

MINOR PROJECT II REPORT
ON

HOME SECURITY ALARM

Submitted by

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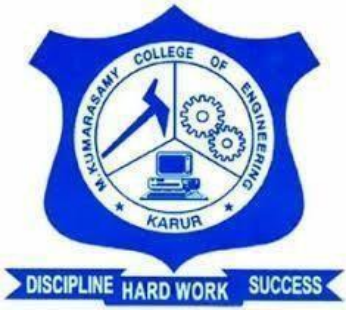

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M. KUMARASAMY COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to Anna University, Chennai)

THALAVAPALAYAM, KARUR - 639113.

MAY 2024

M.KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous Institution Affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this Report titled **"HOME SECURITY ALARM"** is the Bonafide work of **MADHUMITHA K (927622BEE066)**, **SANTHOSH S (927622BEE097)** and **SURENDAR M (927622BEE120)** who carried out the work during the academic year (2023-2024) under my supervision. Certified further that to the best of my knowledge the work reported here in does not form part of any other project report.

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Submitted for Minor Project II (18EEP202L) viva-voce Examination held at M.Kumarasamy College of Engineering, Karur-639113 on…….

DECLARATION

We affirm that the Minor Project report titled "**HOME SECURITY ALARM"** being submitted in partial fulfillment for the award of **Bachelor of Engineering in Electrical and Electronics Engineering** is the original work carried out by us.

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927622BEE097	**SANTHOSH S**	----------
927622BEE120	**SURENDAR M**	----------

VISION AND MISSION OF THE INSTITUTION

VISION

- ✓ To emerge as a leader among the top institutions in the field of technical education.

MISSION

- ✓ Produce smart technocrats with empirical knowledge who can surmount the global Challenges.
- ✓ Create a diverse, fully-engaged, learner-centric campus environment to provide Quality education to the students.
- ✓ Maintain mutually beneficial partnerships with our alumni, industry and Professional associations.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

- ✓ To produce smart and dynamic professionals with profound theoretical and practical knowledge comparable with the best in the field.

MISSION

- ✓ Produce Hi-tech professionals in the field of Electrical and Electronics Engineering by inculcating core knowledge.
- ✓ Produce highly competent professionals with thrust on research.
- ✓ Provide personalized training to the students for enriching their skills.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- ✓ **PEO1:** Graduates will have flourishing career in the core areas of Electrical Engineering and also allied disciplines.
- ✓ **PEO2:** Graduates will pursue higher studies and succeed in-academic/research careers
- ✓ **PEO3:** Graduates will be a successful entrepreneur in creating jobs related to Electrical and Electronics Engineering /allied disciplines.
- ✓ **PEO4:** Graduates will practice ethics and have habit of continuous learning for their success in the chosen career.

PROGRAMME OUTCOMES (POs)

After the successful completion of the B.E. Electrical and Electronics Engineering degree program, the students will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of solutions:

Design solutions for Complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.

PO4: Conduct Investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, andmodern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning in formed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUT COMES(PSOs)

The following are the Program Specific Outcomes of Engineering Students:

- **PSO1:** Apply the basic concepts of mathematics and science to analyses and design circuits, controls, Electrical machines and drives to solve complex problems.
- **PSO2:** Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues &challenges.
- **PSO3:** Design, Develop and implement methods and concepts to facilitate solutions for electrical and electronics engineering related real-world problems.

(ABSTRACT) keywords	MAPPING OF POs and PSOs
✓ Arduino Nano (based system) ✓ PIR Sensor ✓ Buzzer	PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO8,PO9 PO10,PO11,PO12, PSO1,PSO2,PSO3.

+

ACKNOWLEDGEMENT

Our sincere thanks to **Thiru.M.Kumarasamy, Founder** and **Dr.K.Ramakrishnan B.E,Chairman** of **M.Kumarasamy College of Engineering** for providing extra ordinary infrastructure, which helped us to complete the Minor project in time.

It is a great privilege for us to express our gratitude to our esteemed **Principal Dr.B.S.Murugan M.Tech., Ph.D.,** for providing us right ambiance for carrying out the project work.

We would like to thank our **Head of the Department Dr.J.Uma M.E., Ph.D., Department of Electrical and Electronics Engineering,** for her unwavering moral support throughout the evolution of the project.

We would like to express my deep gratitude to our Minor Project Guide **Mrs. R.Indhumathi M.E., Assistant Professor, Department of Electrical and Electronics Engineering,** for her constant encouragement, kind co-operation, valuable suggestions and support rendered in making our project a success.

We offer our whole hearted thanks to our Minor project coordinator **Dr.B.Rajesh Kumar M.E.,Ph.D., Assistant Professor (SLG)., Department of Electrical and Electronics Engineering,** for his constant encouragement ,kind co-operation and valuable suggestions for making our project a success.

We are glad to thank all the **Faculty Members** of **Department of Electrical and Electronics Engineering** for extending a warm helping hand and valuable suggestions throughout the project.

Words are boundless to thank **Our Parents and Friends** for their constant encouragement to complete this Minor project successfully.

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LIST OF ABBREVIATION

S.NO	ABBREVIATION	EXPANISON
1	PIR	Passive Infrared Radiations.
2	LCD	Liquid Crystal Display.
3	LED	Light Emitting Diode.

ABSTRACT

The aim of the home security alarm using a PIR sensor is to detect motion within its field of view. when the sensor detects the changes in infrared radiations (typically caused by movement of people) It triggers the alarm or passes the message. this serves as a deterrent to potential intruders and alerts homeowners or security system to the possible presence of unauthorized person, enhancing overall home security. the proposed methodology of the home security alarm, it is built around an Arduino microcontroller. It is connected to a PIR motion sensor, a buzzer, a resistor, a pair of external terminals. The whole system is battery powered so it is easily portable. once you have the code, you can connect all the external parts. The output of a home security alarm is when the PIR sensor sense motion within its detection range, it sends a signal to the alarm system through control unit. This signal then activates the alarm, which could include sounding a siren, sending alerts to a monitoring service, or triggering other security measures. In summary, the output is an alarm activated in response to detected motion, serving as an alert for potential intrusion.

SAMPLE PICTURES

SURVEY REPORT

By taking the survey from the following localities. We came to know that the people were leaving their houses alone during working hours. So they feel insecurity around their living areas and they were frightened about the robberies and some unknown motions. they are experiencing the major problems like losing their things in recent days.

CHAPTER 1
SURVEY FORM ANALYSIS

This chapter says about the survey which had been taken from the following localities and it also specifies about the problem they had faced.

1.1 NAME AND ADDRESS OF THE COMMUNITY:

NAME: S KARTHIK

ADDRESS: Ramakrishnapuram, Karur.

NAME: R GOMATHI

ADDRESS: Nachipudhur, Namakkal.

NAME: P SRIDHARAN

ADDRESS: Nachipudhur, Namakkal.

NAME: R PONNAMMA

ADDRESS: Nachipudhur, Namakkal.

NAME: S NATESAN

ADDRESS: Ramakrishnapuram, Karur.

1.2 PROBLEM IDENTIFICATION:

By taking the survey from the following localities. We came to know that the people were leaving their houses alone during working hours. So they feel insecurity around their living areas and they were frightened about the robberies and some unknown motions. they are experiencing the major problems like losing their things in recent days.

CHAPTER 2

LITERATURE REVIEW

This chapter says about the projects and their inferences which are related to the "HOME SECURITY ALARM SYSTEM".

Paper 1: Home Automation Engineering: A Home With Eyes, Ears And Plenty Of Smarts.

Inference: A home automation system that could provide security and monitoring along with a wide variety of entertainment options.This home would incorporate infrastructure that can transmit and receive secure high-speed internal and external communication.

Paper 2: Automatic control of electrical appilances using PIR sensor

Inference: Controlling electric appliances with a PIR (Passive Infrared) sensor involves detecting human presence or motion. You can use a microcontroller, like Arduino or Raspberry Pi, to interpret PIR sensor data and trigger appliance control. Write code to respond to sensor inputs, toggling appliances on/off through relays or smart plugs. Calibration ensures optimal sensitivity. Integrating this setup with home automation platforms like Home Assistant or IoT frameworks can enhance flexibility and remote control.

Paper 3: Wireless Technologies, Devices and Protocols for Secure Home Automation.

Inference: A complete wireless networking is an indispensable element of home automation. Wireless technology for smart homes helps you keep an eye on your home when you are away. You can protect what is valuable to you at home or even manage your business remotely. It provides a safe, convenient and smart life through intelligent devices, cloud-based platforms and advanced technologies. Innovative wireless technologies including 4G and 5G have paved the way for home automation.

Paper 4: Solar powered - security system.

Inference: Solar-powered security systems are a practical and environmentally friendly option for homeowners who want to improve their home security. By harnessing the power of the sun, these systems can provide cost-effective and reliable surveillance, even in remote locations that are difficult to reach with traditional wired cameras. By using solar energy, homeowners can save money on electricity bills and contribute to a more sustainable future. More and more people adopt this technology.

Paper 5: Motion sensing security system.

Inference: The developed motion detection alarm and security system gives good response to the motion sensor when it detects intrusion at the windows or doors. It is built with a time delay of 60 seconds to allow the house owner to leave before security mode is activated. This work is useful in the area of security usage, Industries and in automation.

CHAPTER 3
PROPOSED METHODOLOGY

This chapter brings about the proposed methodology of the “HOME SECURITY ALARM SYSTEM” project.

3.1 BLOCK DIAGRAM OF HOME SECURITY ALARM SYSTEM:

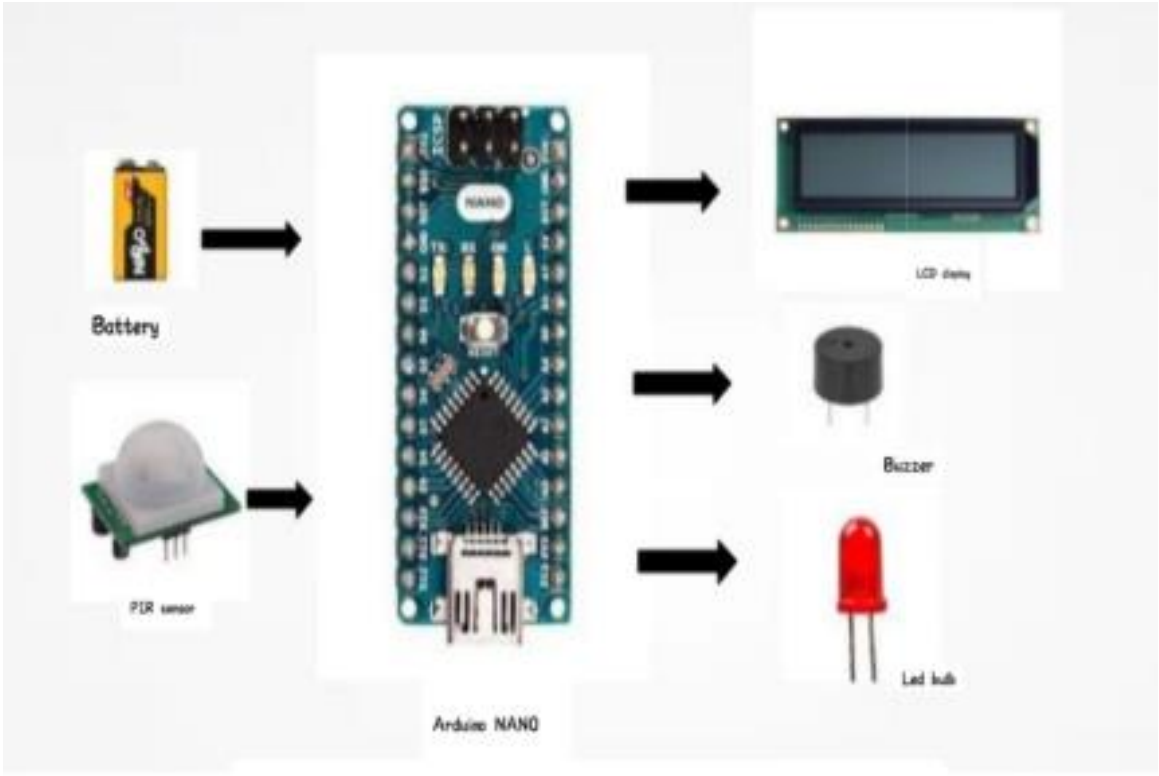

Fig: 3.1 Block diagram of Home Security Alarm System using PIR sensor.

COMPONENTS USED :

3.1.1 ARDUINO UNO

In a home security alarm system incorporating a PIR sensor and an LCD display, Arduino serves as the central control unit, orchestrating the interaction between the sensor, display, and other components. The Arduino processes the signals received from the PIR sensor, detecting motion within the monitored area. When motion is detected, the Arduino triggers the alarm, activating the buzzer and possibly signaling the LED indicator as well.
Additionally, the Arduino interacts with the LCD display to provide real-time feedback to users. It can display information such as the current status of the alarm system (armed or disarmed), any detected motion events, and other relevant data. This allows occupants to quickly assess the situation and take appropriate action if necessary.

Through its programming, the Arduino can also implement various security features such as arming and disarming the system via a keypad or a remote control, logging motion events, and even sending alerts to a connected smartphone or computer. Overall, Arduino's versatility and programmability make it a crucial component in designing and implementing an effective home security alarm system with PIR sensor and LCD display.

3.1.2 LCD DISPLAY

In a home security alarm system utilizing Arduino and a PIR sensor, the LCD display serves as a user interface, providing valuable information about the status of the system. It can display essential details such as whether the system is armed or disarmed, the current time, and any detected motion events. When the system is armed, the LCD may show a message indicating that it's ready to detect motion. Upon detecting motion, the Arduino can update the display to notify users of the intrusion, possibly indicating the specific area where motion was detected.

This real-time feedback allows occupants to respond swiftly to potential security breaches.Furthermore, the LCD display can also be used to configure and customize the alarm system settings. Users may be able to adjust parameters such as sensitivity levels of the PIR sensor, set up entry delay times, or even activate/deactivate certain alarm features.

3.1.3 PIR SENSOR

Passive Infrared (PIR) sensors constitute a fundamental component within home security alarm systems, functioning to detect motion. These sensors operate on the principle of detecting changes in infrared radiation emitted by objects within their designated field of view. Typically covering angles ranging from 90 to 180 degrees, PIR sensors are strategically placed in areas like entryways and hallways to monitor movement. They offer adjustable sensitivity settings to minimize false alarms triggered by factors such as small animals or moving objects like curtains.

Integrated seamlessly into home security setups, PIR sensors communicate with alarm control panels, activating alarms upon detecting motion. They can be either battery-powered or wired into the home's electrical system, catering to diverse installation needs. Some PIR sensors even feature pet immunity, ensuring that the presence of small animals does not lead to false alarms. Overall, PIR sensors are indispensable for bolstering home security, providing reliable motion detection capabilities to safeguard both property and occupants.

3.1.4 BUZZER AND LED

In a home security system utilizing a PIR (Passive Infrared) sensor, both the buzzer and LED play pivotal roles in alerting occupants of potential threats. When motion is detected by the PIR sensor, the buzzer is triggered, emitting a loud alarm throughout the premises. This audible signal serves as an immediate warning, prompting occupants to take action against potential intrusion. Meanwhile, the LED functions as a visual indicator, typically illuminating when the system is armed and ready to detect motion.

Upon detection of movement, the LED may flash or change color, providing a clear visual cue of the alarm activation. Together, these components work in tandem to ensure that occupants are promptly notified of any detected motion, thereby enhancing the security and effectiveness of the system.

3.2 DESCRIPTION

The need for Motion Security Systems nowadays is a serious demand as the number of thefts is increasing day by day, necessitating the implementation of something that will keep us safe. High-end security systems present in the market are not easily accessible to everyone. Therefore, a cost-efficient electronic sensing system is intended to be built, having the capability of sensing the motion of intruders and setting off the alarm. An interesting and cheap motion sensor-based motion security alarm has been designed for this purpose. The gadget is designed to help protect from thieves.

In this project, an Arduino Nano, PIR Sensor, an LCD display, and some other components are going to be used. This project can either be powered with a 9V battery or with a USB cable. The system works as a low light-activated switch that can measure the exact ambient light level and can adjust the whole system depending on the ambient light threshold value. For that, an LDR is taken for measuring this light level. When a logic High-level signal is detected at its sensor input terminal, the alarm will be triggered. Otherwise, it stays in the logic Low-level state.

Passive Infrared Sensors can do this whole process easily and efficiently. When a person passes across the PIR sensor, the motion will be detected by their ambient temperature, effectively controlling the switching of the motion security alarm system. Additionally, the result of the motion sensor can be seen using a 16×2 LCD display. When the PIR sensor is ON, the LCD will display that motion is detected. When nothing is detected, the LCD shows that motion is stopped.

A PIR (Passive Infrared) sensor-based motion security system using Arduino detects changes in infrared radiation to identify motion in its vicinity. When motion is detected, an action is triggered by the Arduino, such as activating an alarm or turning on lights. This cost-effective DIY security system is commonly used for home or office surveillance. The components include an Arduino board, PIR sensor, and optional actuators like buzzers or relays for response.

3.3 COST ESTIMATION

S.NO	COMPONENT	QUANTITY	COST
1	ARDUINO UNO	1	800
2	PIR SENSOR HC -STR501	1	70
3	LED	1	10
4	16*2 LCD DISPLAY	1	200
5	BUZZER	1	20
6	BREAD BOARD	1	200
7	WIRES	As per required	10
		TOTAL	**1340**

Table: 3.3 Cost Estimation of Home security Alarm System.

HARDWARE PHOTO

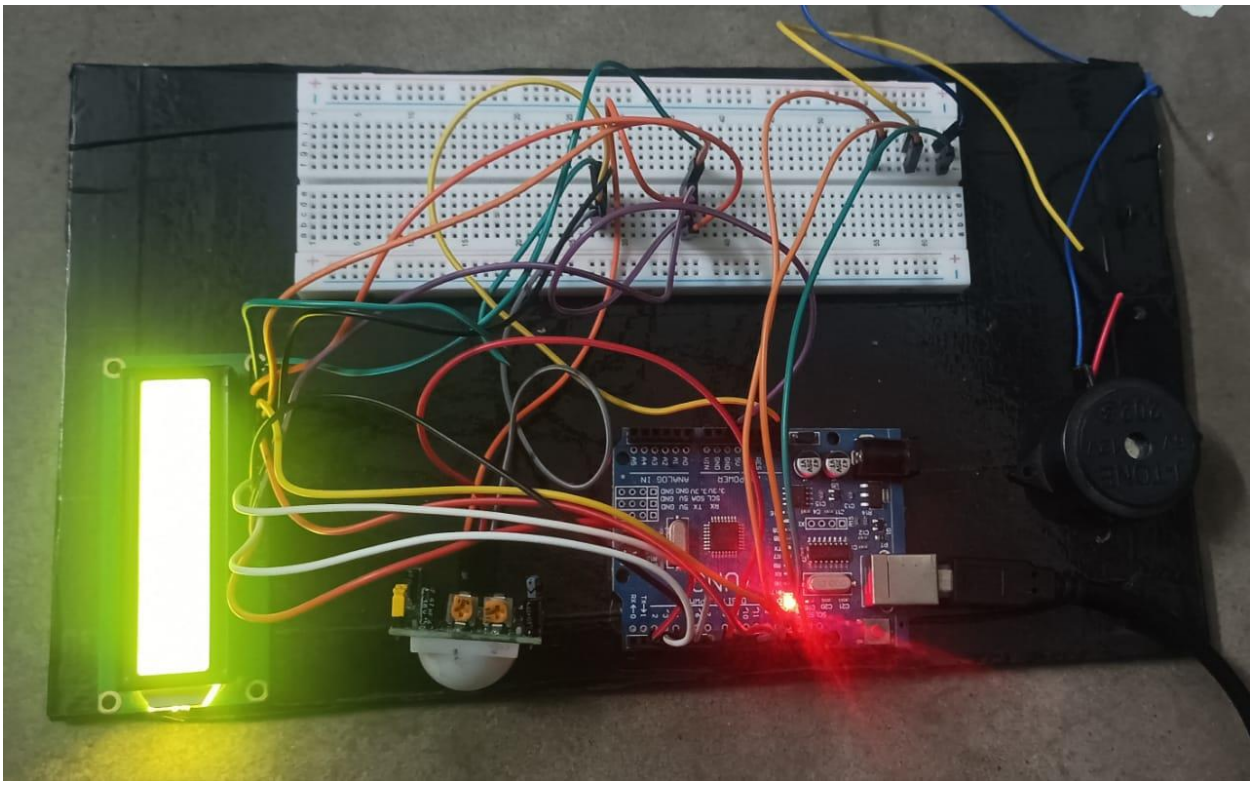

Table: 3.4 HARDWARE PHOTO

CHAPTER 4
FUTURE SCOPE & ITS IMPLEMENTATION PLAN

This chapter brings about the future scope and the implementation plan of the "HOME SECURITY ALARM SYSTEM USING PIR SENSORS".

FUTURE SCOPE:

The future scope of a home security alarm system using Passive Infrared (PIR) sensors holds considerable potential for innovation and expansion. Advanced PIR sensors can be developed to detect not only motion but also other environmental changes, such as temperature fluctuations or sound. Integration with machine learning algorithms could enhance the system's ability to differentiate between intruders, pets, and false alarms.

SOME ASPECTS OF THE FUTURE SCOPE:

- ✓ Integration with Smart Home Systems.
- ✓ Energy Efficiency.
- ✓ User-Friendly Interfaces.
- ✓ Cyber security Measures.

IMPLEMENTATION:

Listed below is the implementation plan of the above mentioned project.

HERE IS THE BASIC OUTLINE FOR THE IMPLEMENTATION:

- ✓ **CONNECT THE PIR SENSOR**: Connect the PIR sensor's VCC to a power source, GND to ground, and OUT to a digital pin on the Arduino nano.
- ✓ **CONNECT THE ALARM DEVICE**: Connect the alarm device (BUZZER, LED DISPLAY) to another digital pin on the Arduino nano.
- ✓ **WRITE THE CODE**: Write a simple code to read data from the PIR sensor and trigger the alarm motion is detected.
- ✓ **POWER THE SYSTEM**: Power the Arduino and sensor using an appropriate power supply.
- ✓ **TEST THE SYSTEM**: upload the code to the Arduino and test the system by moving in front of the PIR sensor. The alarm should activate when motion is detected.
- ✓ **ADJUST THE SETTING**: fine tune sensitivity and delay the setting in the code based on your preferences.

GEOTAG PHOTO

REFERENCES

LINKS:

https://youtu.be/odvXvw9lc3o?si=k83QWYhkHRdEU3D6

https://youtu.be/4V7QIvnh2Dc?si=NEdlCYbEpQHxnRg

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https://drive.google.com/file/d/10zTv482aN5SW0MWnXArEmAhTf3158Jbt/view?usp=drivesdk