



# ARDUINO UNO BASED THEFT DETECTION USING GSM MODULE

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**Abstract** — Nowadays we know that the criminal activities are rapidly increasing day by day everyone needed security for their home. To ensure that everyone in this situation has a secure system of development and advanced technology. So when you move out of your house, you don't have to worry. Therefore, the objective of this project is to provide a home security device that delivers the fastest message to the client of the GSM (Global system for mobile) using a phone call. The most recent technology at a low cost has been installed in our home security system. The PIR (Passive InfraRed) movement sensor, the Arduino sensor as a basic for movement recognition and the GSM module to call system users have been used to build the hardware of this system. For programming, this framework uses the Arduino IDE for Arduino for analysis of joining programming in the GSM unit. An important feature of the PIR sensor, which can be used here for the protection of any unknown person, is that it automatically creates calls when the adjacent circles are detected by the PIR sensor. An integrated framework for home security has been examined and it is able to sense human movement.

**Keywords**— Home Safety or Security, GSM/GPRS shield, PIR Sensor, Arduino, Detection.

## 1. INTRODUCTION

The ability of the home security system to monitor a house without delay has proved its usefulness and benefits. This is due to an increase in the number of burglaries and home thefts, which has made most homeowners more careful. Security systems based on CCTV are not real-time since the owner receives the alarm after the occurrence, unless they were home at the time. A sophisticated network of interconnected devices, including sensors, GSM/GPRS shield, communication designed to offer homeowners a wide range of services and applications with minimal intervention is the innovative home system. Safety and security measures, automation, real-time and energy management are also part of these services. In particular, due to the increasing need for people to feel safe in their homes and reduce crime risk, smart home safety and security systems are of great importance across all services. New possibilities for the deployment of security and safety features in a smart home have been opened up by breakthrough technologies such as Internet of Things (IoT), Compact Micro controller and affordable sensors and actuators. These systems are essential for monitoring the indoor environment, enabling homeowners to receive real time updates and alerts when potentially harmful situations arise even if they're outside their homes [1]. The analysis of data received from sensors in the surroundings, which triggers appropriate action by means of actuators to tackle or prevent potential threats, is a key aim. To address this problem, many researchers are working on custom solutions that can be used by everyone at a reasonable price. In such a situation, we've been planning to create this kind of security system that would make life simpler and more comfortable for people when they are not in their homes. Increasing the speed of pupils' movements requires a safe way to create them. In the words of mobile phone technology, it's capable of simply receiving information [8-10].

## 2. LITERATURE REVIEW

In our daily lives, especially when we're away from home, security concerns have become increasingly important. Modern technology has been used to design solutions for protecting us from different threats in order to address these issues. As a result of recent studies in this field, the area of security research has shown considerable progress. The system is detecting intruders and transmitting messages via an GSM modem. Using Arduino and mobile phones, a remote security system that uses infrared sensors to detect movement and send alerts to the owners of properties. The GSM technology for remote control of home appliances and

security systems, providing feedback through calls and message. The role of the Internet of Things in intelligent theft prevention system, as well as enhanced privacy and security by means of different platforms. In order to increase the level of security, a financially robust framework for home protection is essential. The system will detect unauthorised entry by using PIR sensors, in particular Arduino, to create a security system for protecting personal belongings from theft. A central processing unit that interfaces with sensors and appliances is the Arduino Uno processor. The GSM technology will send a warning message through SMS to the owner's cell phone and display this information on a Mobile screen. Remote notification and action is enabled by the global coverage of this system [2].

Theft detection using PIR (Passive Infrared) sensor, Arduino, and GSM module reveals a growing interest in developing cost-effective, reliable, and accessible security systems. Researchers and developers have increasingly recognized the potential of this technology combination. Studies have explored the effectiveness of PIR sensors in detecting human presence and motion, which forms the core of these systems. Arduino, as an open-source microcontroller, has been a popular choice for building theft detection prototypes due to its versatility and ease of programming. Furthermore, integrating a GSM module allows for real-time communication and remote monitoring, ensuring that users receive immediate alerts in the event of a security breach. Literature in this field often discusses the importance of optimizing power consumption, refining sensor sensitivity, and developing user-friendly interfaces to make these systems practical and user-friendly.

### 3. PROPOSED SYSTEMS

We're mindful of our security, as are the wellbeing and esteem we have in life. In our standard of, living plays an vital part. We've lived in a present day society where innovation has found numerous of the devices we utilize each day. In a circumstance like this, where we've created a framework to control the security module, it can decrease the degree of guiltiness around the globe, particularly domestic thefts. We've planned a gadget that's fundamentally outlined to supply security when the user's out of the house. The framework incorporates GSM module for communication with cellular phones, and the PIR sensors to distinguish deterrents. By recognizing between infrared or brilliant warm focuses transmitted by adjacent objects, the PIR sensor is able to distinguish movement. When the PIR sensor faculties a development, it moves exceptionally quick. Approximately 7 meters or close 22 feet. It should take between 20 to 60 seconds to plan a 100 exact% PIR sensor. For this reason, the PIR sensor must have a roosting time amid which it controls its sensor in expansion to the encompassing environment, in this manner relieving the infrared detector. Through this time, there must be imperceptibly to no development before the sensor. In the event that the sensor isn't given adequate time for calibration, the comes about of the PIR sensor cannot be trusted. At the time of detecting any movement by PIR sensor, the result of the sensor is incredible. The most centre of this venture is to supply security when the client is absent from domestic. The project's primary office, competent of sending messages rapidly, suitably and at a least cost, anyplace on the GSM organize. As the Versatile phone is the most recent and the foremost usable innovation in this day with SMS benefit will be amazingly profitable when utilized to join the security systems or frameworks, where the news coordinates by a security system moreover the news got by the client's cell phone within the arrange of SMS. As a result, an coordinates security system that's competent of coordinating data without the utilize of individual computers to control house condition rapidly and cheaply can be set up.

The Arduino UNO programming language is utilized to form this system, the program was utilized to make a security system that runs normally, which permits two ways to interact with a client's cell phone at the time of a security break within the domestic. The Arduino that's initiating our framework. Arduino is associated to the SIM800C GSM/GPRS Shield at this point by implies of a serial connection to the GSM module to make a call to the pre-modified Flexible cell phone number. It could be a thought to be taken note around PIR that the result will be incredible when it identifies development. The result of PIR sensor more regularly than not endeavors moo presently and once more, in case there's a development which might sell out the microcontroller into seeing that there's no development. To maintain a strategic distance from moo yield signals, our Arduino programming unit is controlled. Which have a shorter interim than the arranged time. The selection of the guideline that development earlier to PIR sensor is ceaseless completed this venture [3].

### 4. MATERIALS AND METHOD

#### A. Arduino Uno:

The Arduino Uno is an open-source microcontroller board that can offer assistance make intuitively ventures. It is based on the ATmega328p processor and the board contains a set of analog and computerized pins that are input and yield pins which are used to interface the board to other components.

The board can be modified utilizing the Arduino Computer program (IDE), which is a Coordinates Advancement Environment common to all Arduino sheets and runs both online and offline. The program is available for gratis download on the official site. The board can be associated to the computer employing a USB cable. The board can be fueled either by USB or an outside control supply. The board is broadly utilized in different applications such as automation and IoT.[4,14]



Fig: Arduino Uno

#### B. PIR Sensor:

A PIR sensor may be a of electronic sensor that measures infrared light transmitting from objects in its field of see. It is commonly utilized in PIR-based movement locators, security cautions, and programmed lighting applications. The sensor is made up of a pyroelectric sensor that identifies different levels of infrared radiation. When a human body or any creature passes by, it intervention the primary opening of the PIR sensor, causing a positive differential alter between the two cuts up. When a human body takes off the detecting zone, the sensor produces a negative differential alter between the two cuts up. PIR sensors are little, cheap, low-power, simple to utilize, and don't wear out. They are a prevalent choice for detecting movement in appliances and contraptions utilized in homes or businesses [5,11].



Fig: PIR Sensor

#### C. SIM800C GSM/GPRS shield:

The SIM800C GPRS/GSM Shield with Receiving wire could be that allows you to utilize the GSM phone network to get information from a farther area.



Fig: SIM800C GSM/GPRS shield with antenna

It is consistent with all sheets that have the same shape figure and pinout as a standard Arduino Board. The shield can be utilized to create or receive phone calls, send or get SMS content messages, interface to the web through GPRS. The module supports quad-band GSM/GPRS arrange, which shows that it works pretty much in farther locations[6,7].

#### D. Jumper Wires:

Jumper wires are electrical wires that have a connector or stick at each end, which is ordinarily utilized to interconnect the components of a breadboard or other model or test circuit, inside or with other equipment or components, without patching. They are ordinarily used with breadboards and other prototyping apparatuses in arrange to create it easy to alter a circuit as required [15].



Fig: Jumper Wires (Male to Female)

#### E. SOFTWARE

The Arduino Coordinates Advancement Environment or Arduino Program (IDE) contains a content editor for composing code, a message range, a content comfort, a toolbar with buttons for common capacities and a arrangement of menus. It interfaces to the Arduino equipment to transfer programs and communicate with them. computer program that permits clients to compose and transfer code to Arduino sheets. You'll be able the Arduino Uno by using Arduino computer program. The Arduino IDE may be a open-source It is consistent with Windows, macOS, and Linux working systems[16].



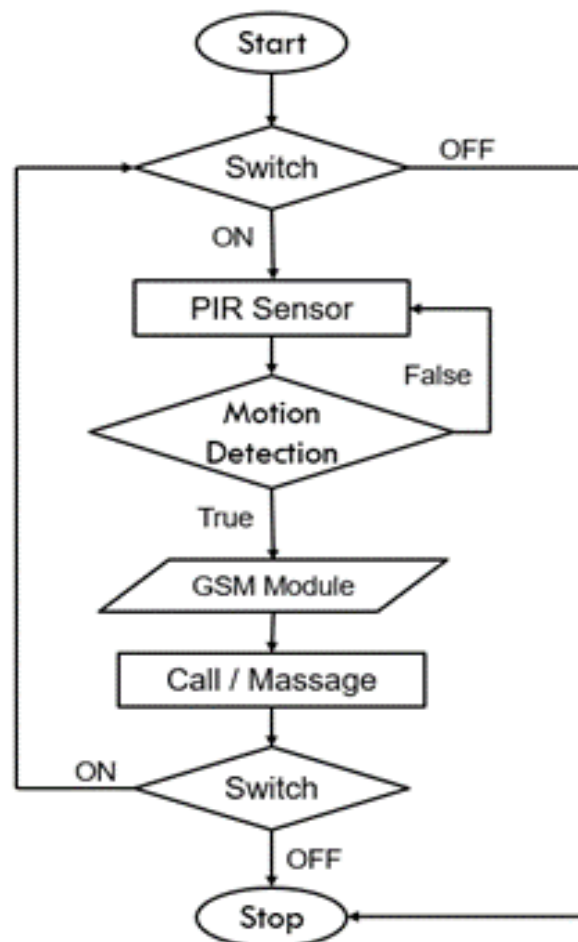
Fig: Arduino Uno IDE

#### 5. STREAM CHART

To create it simpler to get it, we're speaking to the stream chart. In today's society, where extortion is expanding, home safety caution frameworks are of extraordinary significance. Much obliged to mechanical progresses, the proprietor of a domestic doesn't need to stress approximately its security when he takes off his or her house. They'll too alarm the proprietor of the house immediately.

The PIR sensor should be actuated and the different infrared or brilliant warm sources which are released by adjoining objects may be recognized to identify development. For the most part talking, when a PIR sensor faculties development, the result goes to the most noteworthy level. Usually required as the PIR sensor includes a roosting time. through which it calibrates its sensor permitting to the environment and lightens the infrared finder. Amid this time, there must be exceptionally small to no development ahead of the sensor. On the off chance that the sensor isn't given adequate time to calibrate, the result of the PIR sensor may not be dependable. The result of the PIR sensor will be extraordinary when it faculties any development. The Arduino faculties it. To create a call to a preprogrammed cell phone number, it interfaces to the GSM portion by means of a serial association. An vital thing approximately PIR sensors is, the result will be extraordinary when it faculties or identifies movement. The result of the sensor gets to be least from time to time, not with standing when there's a development which may trap the microcontroller into seeing that there's no movement.

Underneath are the workings of the project.



## 6. RESULT AND DISCUSSION

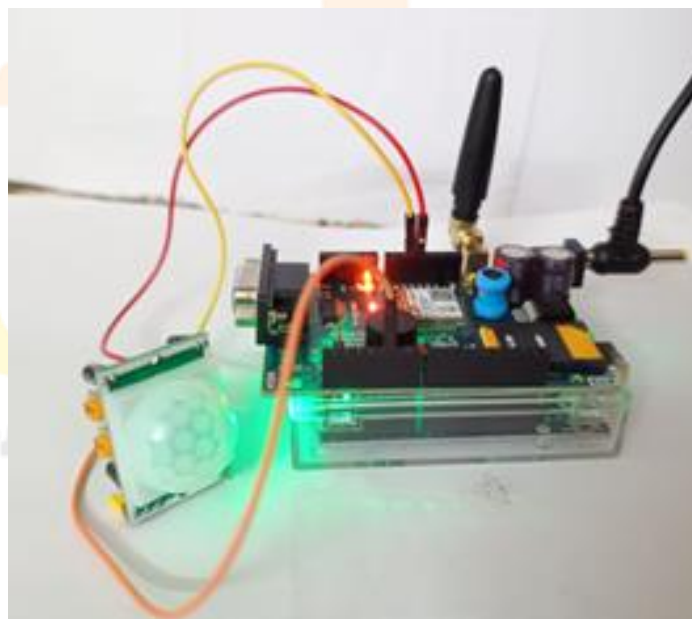


Fig: Extend implementation

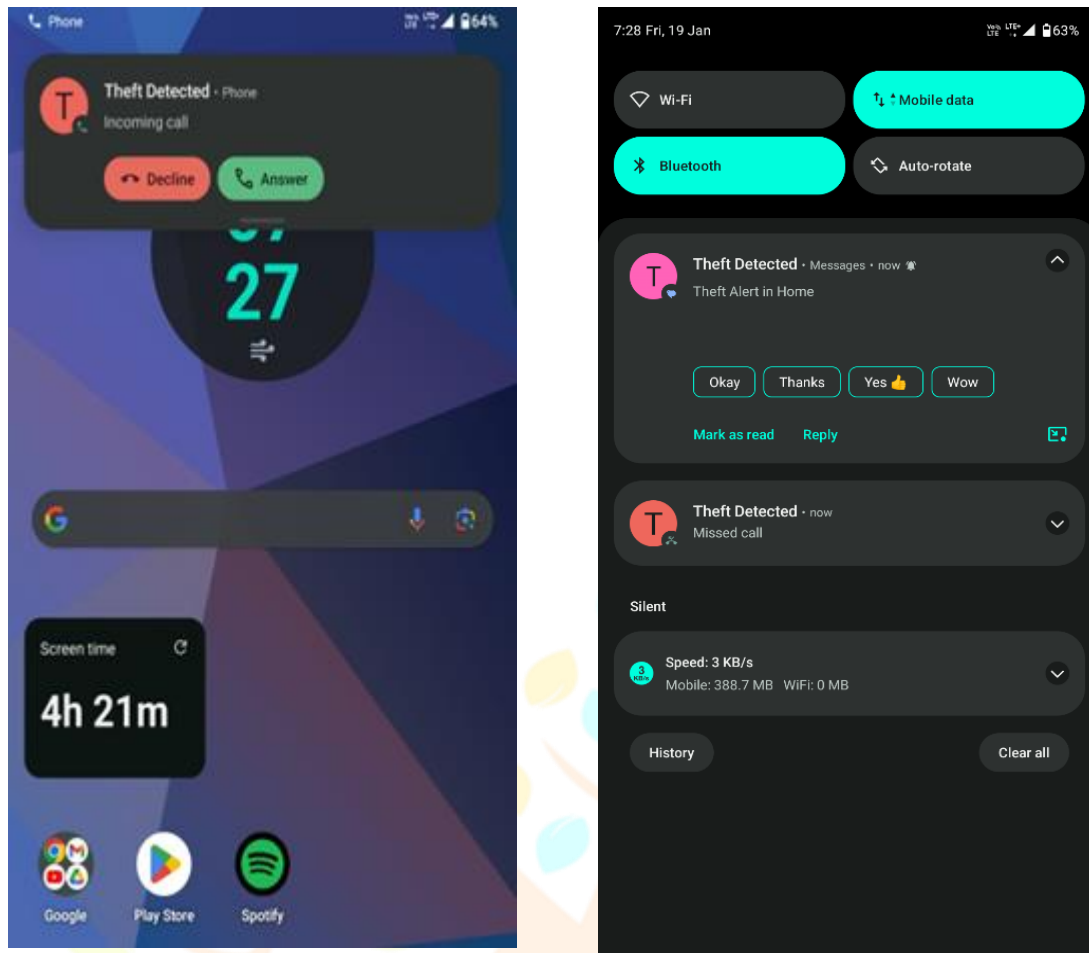


Fig: Receiving Phone call and SMS on mobile

After running our extend when the PIR sensor begin and the pin esteem goes tall then it sends a signal voltage to the GSM Module SIM800C and after that takes some minutes to check adjust in the event that everything is obvious at that point SIM800C make a call to the focused on number that we store in our program. We'll make beyond any doubt that all frameworks work appropriately agreeing to the algorithm.

## 7. FUTURE PLAN

When domestic security system on, the system will check the zone capture by PIR sensor. The system will send a caution through SMS to the client's portable phone in case it is recognised as a deterrent, and it can also Call to client. In see of our deficiency and require, the security of our homes is getting to be increasingly vital. Individuals are getting to be increasingly stressed around securing their domestic from unapproved persons.

Utilizing sensors that can be associated to microcontrollers such as Arduino and Sim800c GSM/GPRS shield, our system is able of checking homes. By utilizing SMS to send clients an caution when a conceivable interruption occurs, by means of cell phone. About everybody is employing a phone these days, utilizing SMS capacity to communicate between the system and its clients, it resembles a covered up domestic security system.

## 8. CONCLUSION

A client inviting and dependable plan for security utilizing remote communication. A Arduino Uno Based Robbery anticipation framework with GSM integration is an important apparatus for moving forward security by rapidly recognizing unauthorized get to and probable theft. These gadgets are outlined to anticipate attackers and gives confirmation to supply early notices. Give security at nearness and unlucky deficiencies of the proprietor. We'll implement our full and final system with progressed technology.

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