

# DESIGN SECURITY SYSTEM BASED ON ARDUINO USING MOTION TRACKING CAMERA

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## ABSTRACT:

*Advanced technologies make life easier by allowing people to protect their belongings from thieves even if they are located in separate places. Due to theft in homes, offices, and organisations, most people are concerned about how to protect their items such as ornaments, vital documents, and the money kept at home. As a result, the majority of housewives employ almanacks and secure lockers in their homes to protect their valuables. However, they continued to employ a manual lock and key mechanism, offering no notification to the customer when a theft occurred by breaking them.*

*When our belongings are taken away, Arduino sends a notification to your phone. In this paper, we show how Arduino recognises whether or not a robbery has occurred. The Arduino is used in conjunction with a mobile phone and a motiondetecting camera in this study to create a security system. The current system does not provide accurate results. The suggested system includes a PIR motion sensor that detects motion in the environment and assists in motion capture using a camera. It also delivers the signals to the Arduino which produces the output. When someone steals his belongings, it makes a call to the owner.*

## I. INTRODUCTION:

Our lives and movable assets are safeguarded by security. It is critical to ensure the safety and security of individuals and their valuables in their homes to avoid illegal protection from invaders through theft, which is not safe. For many people in rural and urban regions, safety has recently become a major concern. Things will try to defraud or steal property, jeopardising the security of their goods such as decorations, essential documents, and money in their homes, offices, and offices. To combat this security issue, most people will instal a slew of locks or devise a sophisticated home security system that includes loss detection devices.

However, robberies are becoming more common as a result of mechanical locks that may be quickly broken by technological tools. I move anything around the motion sensor to see if it's there or not. This sensor enables us to determine the motion. If an event is identified. Arduino will play an alert sound and send a lightweight notification to the owner through call. We also have a motion camera that takes pictures when there is movement at the sensor. An Arduino is a micro control kit that, thanks to its open source hardware characteristic, may be directly utilised by the supplier to purchase it.

#### OBJECTIVE:

The goal of this project is to build and create a wireless communication link to monitor areas that require high security, such as banks, offices, homes, and colleges to increase security and reduce the number of theft cases.

- To locate the criminals.
- To develop an extremely dependable system.
- Sensors are used in the suggested system.
- Creating a low-cost security system
- To create a security system that includes a motion detection camera.

#### NEEDS AND IMPORTANCE:

It's an open-source project, which means the software/hardware may be tweaked and extended with ease. It's versatile, with a wide range of digital and analogue inputs, as well as SPI and serial interfaces and digital and PWM outputs. It's simple to use, connects to a computer through USB, and communicates using a standard serial protocol. It may also be used as a standalone device or as an interface for PC/Macintosh systems. It is the affordable and includes free authoring tools. Arduino has a burgeoning online community; there is currently a lot of source code available, and we can share and submit our examples for others to use. This security system can be implemented using both software and hardware tools. It is less expensive. To provide a secure system

that can be relied on. Sensors are used in the suggested system.

#### ADVANTAGES:

- Low cost easy to install we can find the theft quickly.
- It automatically sends an email to the owner.
- It does not require a lot of storage to store the photo saves the data (while a security camera requires a lot of storage to store the data).
- It simply requires 2-10 Mb of space.
- No middleman
- Best self-monitoring home security systems
- Flexible configuration

#### II. LITERATURE REVIEW:

GSM is a GPRS extension that allows for faster data transmission. The GSM module is primarily used to establish connection between the host and the GSM module. In this implementation, the host is a mobile smartphone, and any data from the microcontroller is relayed to the user via wireless connection via the GSM module [1].

Android is an open source operating system for mobile devices and a corresponding open source project led by Google [2]

To implement this we have to use Arduino and a motion-tracking camera together. To develop a high-security system and wireless communications between devices. We can use software and hardware tools to implement this security system [3].

As mentioned earlier, cache memories greatly increase the processor performance but they are also responsible for a high portion of the processor's power

consumption and chip area (which affects processor cost [4].

Furthermore, we can detect and track a person movement using an improved particle filtering method. This method can help the system predict which way the object will go and can also alert other cameras to the fact that the thing is likely to appear [5].

The board has serial communication interface, including Universal Serial Bus (USB) on some models that are also used for loading programmes from personal computers [6].

After detecting the motion, the system's infrared sensor transmits a signal to the microcontroller. The device takes a photograph after analysing the signal and sends warning message to the property owner's stored phone numbers. This can help to lessen the chances of a break-in [7].

The microcontroller is usually programmed using C and C++ programming language [8].

Android is a Linux-powered operating system developed by Google and designed for touch screen mobile devices like smartphones and tablets [9].

For security and automation, the system can be accessed by infrared, Wi-Fi and GSM. The proposed system characteristics involve remote control of appliances, system security and intrusion control using GSM based wireless technology [10].

### III. EXISTING SYSTEM:

I placed the treasure on the force sensor to see if it was present or not. This sensor informed us of the weight of the prize. If the sensor's output value falls below a certain threshold, it signifies the treasure isn't there and has been stolen. Here we are using force sensors to show the result.

I'm going to show you how to spot someone taking your valuables in this project. If a sensor is identified, Arduino sends an email message as well as a sound and light alarm. I placed the treasure on the force sensor to see if it was present or not. This sensor informed us of the weight of the prize. If the sensor's output value falls below a certain threshold, it signifies the treasure isn't there and has been stolen. Whatever the object when u place on the table which consists of a force sensor it will calculate the weight of the thing using that sensor. When the thing is stolen two things will happen at a time. The first one t will send a signal to the Arduino according to the code. It will alert a mail to the user or owner, switching voltage to sound and light. The second one sends a signal to the same Arduino. Then it will give a signal to the camera. The work of that camera is to capture the person. A load cell or weight sensor is also known as a force sensor. Compression, force, strain, and load are all measured using them. Many contain inbuilt strain gauges connected to the metal framework that react to even the tiniest compression by creating a change in resistance and providing feedback.

#### IV. PROPOSED SYSTEM:



Fig 1: force sensor



Fig 2: laptop on the force sensor

Force sensors have become incredibly accurate thanks to technological advancements, even if they are very small in size. All of the force sensors we sell are of excellent quality and performance.

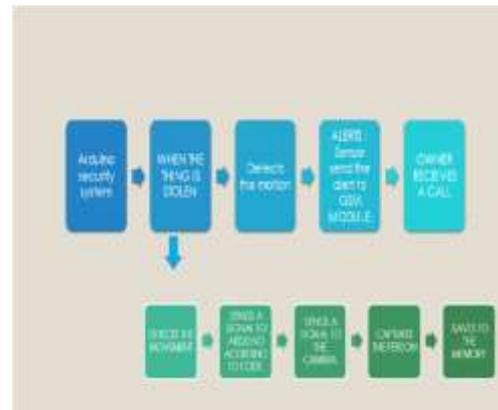


Fig 3: Block diagram

Easy to implement with Arduino with High security system and also Wireless communication system. We can implement with the same system and also we can implement other techniques of a laser security system. It requires less cost to implement. When valuable items are taken, the sensor detects motion to see if somebody is moving in front of it or in its vicinity, which prompts the sensor to send signals to the GSM worldwide system for the mobile module. Which is based on code and generates a call to the owner of the objects. It also performs another task at the same time: if it detects movement, it sends a signal to the Arduino UNO, which then sends the signals to the motion camera, which records the person who has stolen the items.

It preserves the memory so that we can quickly identify the thief utilising this Arduino security system with a motion tracking camera. The Arduino UNO board is used to dump code written in Arduino side programming using inserted c coding from the square chart, and the appropriate yield may be checked by interfacing it to the Arduino UNO board. The atmega328 microcontroller was used, which is a top of

the-line device. a ringer, a sim module, and a PIR sensor are connected to Arduino, and when somebody walks in front of the PIR sensor, the signal caution will turn on, and the sim module will send the message to the client. there is also a camera that records the image and saves it to memory.

This project will investigate how to connect a human motion sensor to a microcontroller such as an Arduino. that will connect an Arduino to a human movement module and a drove, and begin recording the recordings on a neighbourhood machine, much like an Android. This endeavour will be manufactured by the segments that follow. this project will investigate how to connect a human motion sensor to a microcontroller such as an Arduino. The system has used the hardware tools and the software programming to complete the this project. Whatever object you place on the table, which is made up of a motion sensor, detects movement using that sensor. When an object is looted, two things occur at the same moment. The first code delivers a signal to the arduino. It notifies the user or operator to call and converts the voltage into sound and light. The second sends a signal to the same Arduino. Then it will send a signal to the camera.

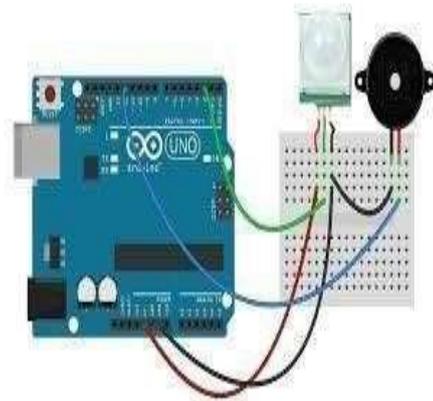


Fig 4: Arduino with PIR sensor

## V. RESULTS:

The Arduino Security System could be a technology that detects such motions using PIR (Passive Infrared Sensor) sensors. This gadget was made for home security systems. As a knowledge processor, it uses an Arduino Uno. The information is processed by Arduino when the PIR detector detects movement. GSM Alarm System– This project is based on a safety system that utilises a PIR sensor, an Arduino Uno, and a GSM module called "SIM9001." For intruder detection, the PIR sensor is used.

A call is placed to the specified number whenever an unauthorised person is detected. when the motion is detected, the Arduino security system automatically captures the theft and makes a call to the owner. When a PIR Motion Sensor is activated, all you have to do is check for a HIGH signal on the Sensor's Digital Out Pin whenever motion is detected. However, a lot is going on within, and the sensor's input and output are reliant on several variables.

The real PIR Sensor, which is covered by a lens, is made up of two slots, each of which is made up of IR Sensitive materials. Both slots in the sensor detect the same quantity

of infrared radiation in typical conditions when there is no movement in front of the sensor. When there is movement in front of the sensor, such as a human or a cat, the sensor will activate.

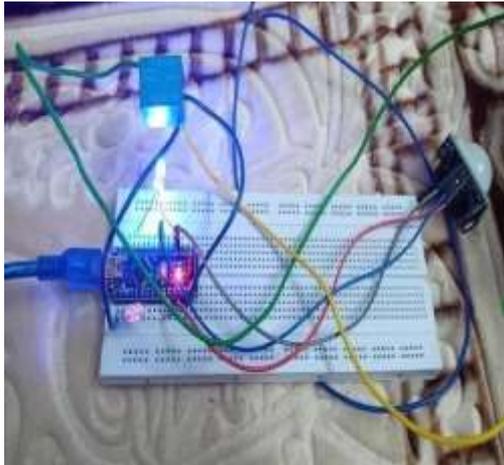


Fig 5: Automation camera

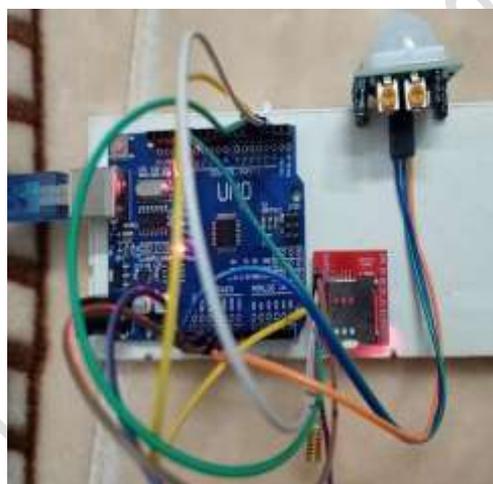


Fig 6: Arduino GSM module

## VI. CONCLUSION:

We presented a method for improving the security system's performance. It can be used to provide high security in a variety of situations.

A security system based on Arduino technology is built in this project. The movements of a burglar or criminals can be detected using this technology. It may also issue multiple warning calls and take a photograph of the suspected area in real time. The following are the advantages of the system: It has a practical design. It ensures a high level of safety. Long distance warning calls can be made, and a photograph of the burglar can be taken.

## APPLICATIONS:

Houses With Smart Technology:

Motion sensors, outlet control, temperature sensors, blower control, garage door control, airflow control, sprinkler control, and bill of materials are all control systems that can be used with Arduino boards to control house activities.

RADAR (Radio Detection and Ranging) is a radio-wave-based object-detection system that can determine an object's range, altitude, direction, or speed. It could be used for air traffic management at airports, long-range surveillance, and ship-based early warning systems. A missile guiding system's heart is this system. Several small portable radar systems, as well as systems that take up several large rooms, are maintained and managed during wartime.

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