

## Advanced Security and Automation System

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### ABSTRACT:

In recent world, the security and automation have become more powerful and make ease of the life. Now a day's this security and automation is very much needed in our day to day life. The security and automation are done with the help of some variety of sensors controlled by the Arduino. In recent world, there are many security and automation systems for home which will work individually with individual system, so when it comes with the point of view of complete single control system, the individual systems of each security and automation systems are difficult to organize to the complete single control system. And still now there is no device for complete control system of organizing all the individual systems. So we came up with an idea of controlling all the individual systems by organizing it to one complete full control system for home. The Arduino will play a vital role in controller of the system. And there are some various types of sensors used here to sense each and every required signal for the system.

**KEYWORDS:** Security, Automation, Arduino, Individual systems.

### 1. INTRODUCTION

In modern technologies, there are many individual systems for security and automation in home but there is no complete control system for organizing all these individual system into single system. So we came up with a solution of organizing all the individual system to a single system for complete control of home. As the name indicates our project is going to make new technology based upon our recent generation that is advanced security and automation system for home. Here we are dividing our system into two sub-systems. The first sub-system is home security system. And the second sub-system is smart appliances. In Home security system we have four parts, first one is thief detection, used to detect the thief or unwanted person roaming outside around our home. Second one is gas detection, used to detect the gas leakage in our home and give alert for us. Third one is flame detection, used to detect the sudden flame accident in our home and spray the water. Fourth one is secured door lock, used for security purpose, except home members other than that no one is able to open the door. And then next smart appliances also divided into four parts. First one is automatic water level controller, used to control the water level in the tank and helps us from wastage of water. Second one is automatic gardening, used to garden the plants

whenever the plant is in need of water, this will help us from plant decaying. Third one is automatic night lights, used to help us from falling down in the night time. Fourth one is automatic fan, used for automation.

## 2. LITERATURE SURVEY

Vinay Sagar K N explain us about home automation using internet of thing, here we learnt how to controlling the different sensors and how to collect the sensors output.

Angel Deborah S explain us about home automation systems, here we learnt how to controlling the devices using smartphones and also learnt the GSM module working and function.

Surinder Kaur explain us about home automation and security system, here we learnt how to interface the android application to GSM.

Han ni zaw explain us about Design and Implementation of Flame Sensor and Obstacle Detection for Automatic Fire Fighting Robot, here we learnt about the use of flame sensor and ultrasonic sensors.

### COMPONENTS USED:

#### PIR SENSOR:

Passive Infrared Sensor (PIR) it is used for motion detection to sense movement of people, animals, or other objects.

When the sensor detects a movement of people, it will send the electric pulse to the Arduino. The output will swing high or low. Fig 1 shows the PIR sensor.



**FIG.1 PIR Sensor**

#### GAS SENSOR:

Gas sensor is used to detect the presence or concentration of gases in the atmosphere.

Based on the concentration of the gas, sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. Fig 2 shows the gas sensor.



**FIG.2 Gas Sensor**

### **FLAME-SENSOR:**

Flame sensor is used to detect the fire in the house and it will send an alert on our Smartphone.

This sensor detects flame otherwise wavelength within the range of 760 nm – 1100 nm from the light source. Fig 3 shows the flame sensor.



**FIG.3 Flame Sensor**

### **SOIL MOISTURE SENSOR:**

Soil moisture sensor is used to gauge the volumetric content of water within the soil.

Soil sensors measure the volumetric water content not directly with the help of some other rules of soil like dielectric constant, electrical resistance, otherwise interaction with neutrons, and replacement of the moisture content. Fig 4 shows the soil moisture sensor.



**FIG.4 Moisture Sensor**

## **RADIO-FREQUENCY IDENTIFICATION (RFID):**

RFID is a method of data collection that involves automatically identifying objects through low-power radio waves.

Data is sent and received with a system consisting of RFID tags, an antenna, an RFID reader, and a transceiver. Fig 5 shows the RFID Tag.



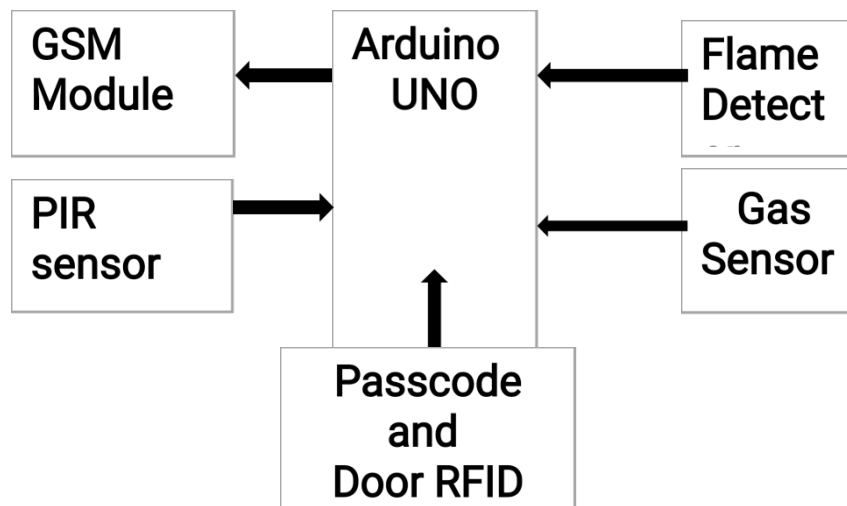
**FIG.5 RFID**

## **WORKING:**

In Our Project we have four segments of security systems, First segment with PIR sensor, PIR sensor has three terminals, two terminals are connected to the arduino for power supply and one terminal is connected to the arduino to read the digital output of PIR sensor. PIR sensor is basically a active low device, when it detects the motion it generate active low signal else it will generate active high signal, so when the signal is read low from the PIR sensor by the arduino , the arduino transmit signal to the GSM module then it send message to the house person, here the GSM module is used to send the messages to the person living in the house. next second segment with flame detector, Flame detector has three terminals two terminals connected to the arduino for power supply, one terminal is connected to the arduino to read the digital output signal from the Flame Detector, here the flame detector is active high device , it generate active high signal when it detects the flame else rest of the time it generate active low signal ,so when the signal is read active high from the flame detector by the arduino, the arduino transmit a high signal to run the water pump which is connected to the arduino, the water pump flow the water to stop the flame, when the signal is read low from the flame detector by the arduino , the arduino transmit low signal to stop the water pump. next third segment with gas sensor(MQ6), gas sensor(MQ6) has three segments, two terminals are connected to the arduino for power supply, one terminal is connected to the arduino to read the digital output signal from the gas sensor(MQ6), it is also a active high device, so when the gas is detected it will generate the active high signal else the rest of the time is will generate the active low signal, when the signal is read active high from the gas sensor(MQ6) by the arduino, the arduino will lead the servo motor to rotate , the servo motor

is connected with the window , so then the window will open and the gas is allowed to move out with the help of the window opening.

When it detects active low signal, the window is get closed. then the last segment with RFID, here RFID is used for door locking, RFID has two segments a transmitter and a receiver, transmitter segment is the RFID tag and the receiving segment is the RFID receiver which is connected to the arduino, the RFID tag has an address where address is applicable only for that RFID tag, so that address is programized before to the arduino for the verification. When the programized RFID tag is read by the RFID receiver, then the arduino will produce the LED light to Glow and the Door has the permission to open. So We Hope with the help of all these Sensors and their Applications we can protect Our Home from the Threads and Thiefs. Fig 6 shows the block diagram of home security.



**FIG .6 Block Diagram for Security System**

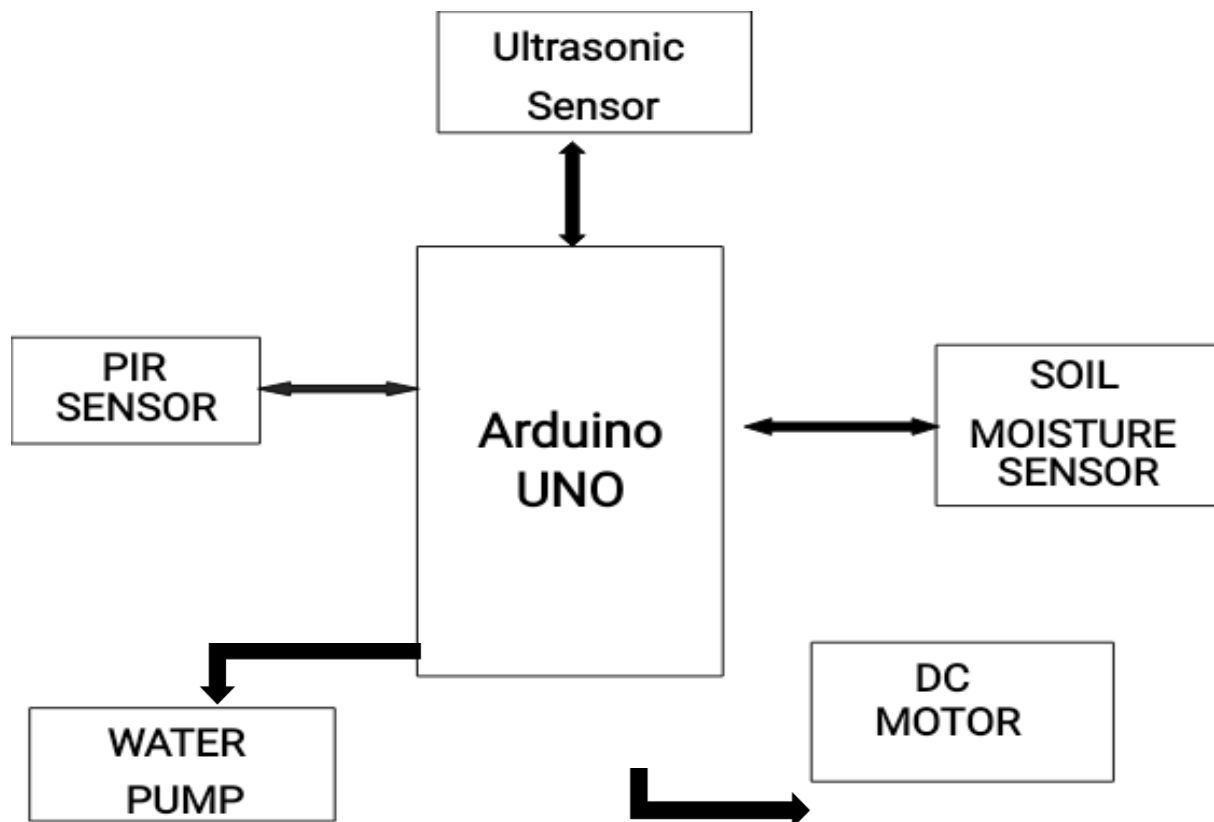
With the help of another Arduino we had developed a smart home i.e, automated working, which is helpful for us in many ways which saves our time, our money and our need. First one is automated light during night. i.e, when we wake up at night time all the lights will be turned off for our sleeping. At that time when we are in the need to use restroom or to get a water drink. Lights will be turned on when you cross the lights this is done by using a PIR sensor, when you cross the sensor, the sensor will detect your motion and the light will glow up or the light will turn on and will turn off after you move away from the sensor.

This is helpful in the way that you don't have the need to search the light button to turn on and the light which we use with the sensor will be below our knee on the wall mounted so if the light is glow up, there won't be any disturbance to the other house members who are all sleeping. Second one is automated water tank motor. i.e, in this we use ultrasonic sensor for measuring the water level in the tank and when the ultrasonic sensor sense the water level as large distance then the Arduino send the signal to turn on the motor and then the motor will be turned on a the water will starts to flow in the tank and when the ultrasonic

sensor sense the water level as small distance then the Arduino will send the signal to stop the motor.

This help us in many ways such as saving the water from waste of flow, saving the time and saving the need. Third one is automated fan. i.e, this is also done with the help of ultrasonic sensor when the sensor detects the human motion then the fan will automatically turn on and when the sensor didn't detect the human motion then the fan will automatically turn off. The turn on and turn off operation of fan will be controlled by Arduino. And the last one is automated gardening. i.e, this is done with the help of soil moisture sensor. The soil moisture sensor will detect the soil dry and wet condition.

When the sensor detect that the soil is in dry condition then the Arduino will send the signal to watering the plants with the help of water pump and when the sensor detect the soil is in wet condition then the Arduino will send the signal to stop watering the plants. And then we are going to connect all these sensors to the NODEMCU ESP8266 (Wi-Fi Module). With the help of NODEMCU ESP8266 we can control all these sensors using our mobile phone using BLYNK app. This also help us by saving the time and saving the water. By all these methods of smart way the home is becoming smarter more and more and becomes a smart home. Fig 7 shows the block diagram of smart appliances.

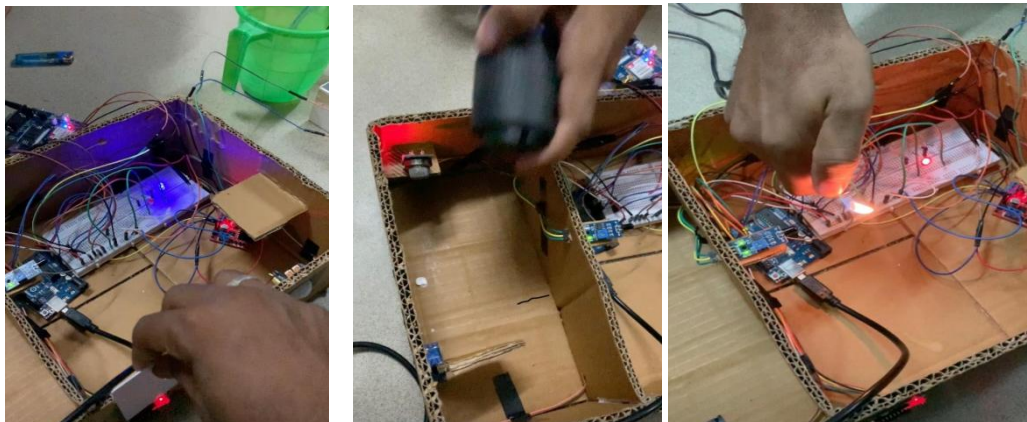


**FIG .7 Block Diagram for Automatic water irrigation**



## OUTPUT:

In PIR sensor, when there is a continues movement in outside of house, it will detected by PIR sensor. It will send alert Notification to respective persons. In gas sensor, when there is leakage of gas, it will get detected by gas sensor, after that the window of respect room gets opened via servo motor. In flame detector, when there is a detection of flame, the water gets sprinkled by using water pump. In RFID there is RF reader which was already placed in door, the person has RF Tag, when he/she takes nearer to the reader , it will gets detected, if the unique id matches , or else the alert message will send to the respective person mobile using gsm module. In Soil moisture sensor, sensor continuously sensing the soil moisture, when the reading value comes below the normal moisture value the watering gets started, and after reaching above the normal value it will gets stopped. In watering level controller, ultrasonic sensor continuously sensing the depth of water (via distance between the sensor and water), when it reaches the below normal level, the motor start filling the water and after reaching above the normal level the motor will gets turned off. In automatic turning ON and OFF of lights using PIR sensor, when there is no motion gets detected the lights will gets turned off, it will glow according to PIR sensor. In automatic turning ON and OFF of fan using ultrasonic sensor, when there is no motion gets detected the lights will gets turned off, it will glow according to PIR sensor.



## 3. CONCLUSION

From the above project, it is concluded that all the home automation system techniques uses wireless technology. Arduino, GSM based home automation techniques have been implemented in order to provide ease to the people to control their home appliances. Different home automation techniques using Arduino, GSM and Arduino are given with their design, implementation and flowcharts which gives the successful layout of their strengths and weaknesses Main purpose of home automation system is to provide ease to people to control different home appliances with the help of the Arduino and to save electricity, time and money. This system also helps the user to protect their homes from burglars when they are away from the home by using alarm as the alarm will start ringing whenever a burglar

tries to enter the house and the person will receive a message on his mobile phone whenever some other person will try to enter the owner's house.

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