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Smart Home Automation and Gardening

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ABSTRACT- *Home automation system is one of the most popular control systems and it increases the comfort of life. In this paper an overview of the home automation systems is discussed. This home automation system consists of a microcontroller Arduino. A smart phone application is used to control the home appliances. Home automation helps to control and monitor the household appliances like door, fan, AC, microwave oven etc. It also provides home security. The main objective of this system is to control home appliances and alert in critical situations. Smart homes are moreconventional. It is being introduced to save our time. The system is designed to control electrical appliances and devices in the home with relatively low-cost design, user-friendly and easy installation*

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I. I.INTRODUCTION

Home automation is become more popular and beneficial because of its safety and security. In recent days, home automation became more advanced and precise to monitor all the home appliances. This system is the energy efficient and user-friendly smart home technique. Home automation system involves basic features to maintain the user comfort and satisfaction. This proposed system is a combination of Android smart phone which include Arduino Uno Board,Bluetooth module, RFID and Soil Moisture Sensor.

II. LITERATURE SURVEY

A. BLUETOOTH BASED HOME AUTOMATION SYSTEM USING ANDROID APP

The android application is used to transmit the instruction, which carries the information about the operation that is to be performed. The transmitted instruction is then received by the Bluetooth module HC-05 which has been paired with the android smartphone. The data received is now transferred tothe microcontroller which processes the data and switches on the relay asinstructed by the data. When the same data is received, the corresponding relay is then switched off.

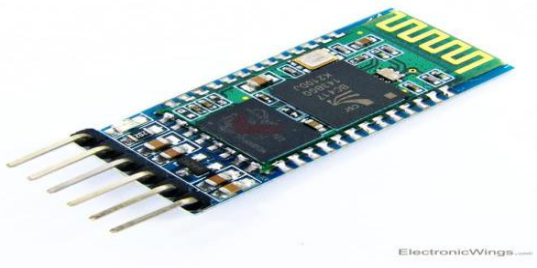


Fig 1.Bluetooth module

The HC05 is a wireless Bluetooth module which acts as the connecter to the android app and the microcontroller which is Arduino Uno. Its operation is 10 meters

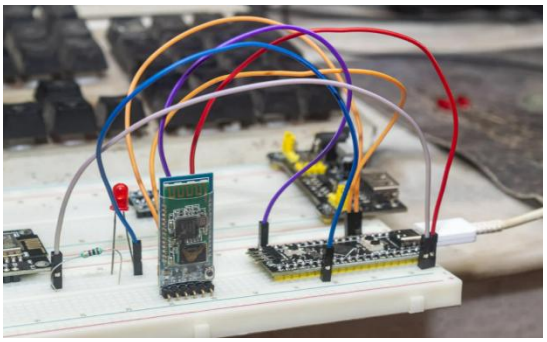


Fig 2. Circuit for Bluetooth based home automation

B. RFID

RFID is Radio Frequency Identification Detector which is a basic and cheapest technology and allows wireless data transmission. Here the microcontroller is Arduino UNO and the RFID serves as the input of the microcontroller. The RFID Cards are required and they must be scanned into the system through the module for opening and closing the door. A servo motor is included which controls the mechanical action of the door.

The simple mechanism is first the RFID tag will be scanned by the RFID scanner, then the command will pass on to the microcontroller which checks whether the card is registered and then the command will go to the servo motor, and as a result of programming the servo motor will be rotated so that the door lock system will work.

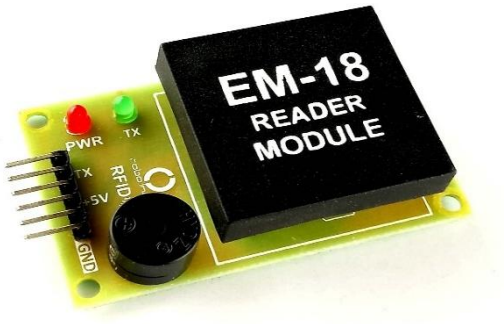


Fig 3. RFID reader

Radio frequency identification (RFID) is a device that detects the radio frequency that is from the tag.The detector sends the individual data which is different for each tag to the microcontroller and the data will be displayed in the alternate screen. The RFID tag is portable and easy to use and it ensures safety.

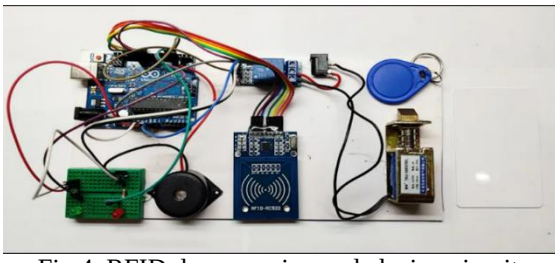


Fig 4. RFID door opening and closing circuit

C. SMART GARDENING USING SOIL MOISTURE SENSOR

The soil moisture sensor checks the level of moisture in the soil. If the moisture level is present in the soil, then conduction occurs between the two probes of Soil Moisture Sensor.The sensor senses the water content and send the signal to the microcontroller. As the soil moisture requires removing, drying and also weighting of a sample, the level of water content is measured by soil moisture sensors indirectly by using soil. Soil moisture sensors are used in research applications such as agriculture, environmental science etc. Here, this sensor is used to check the moisture level in the soil and in case moisture level is low then the Arduino which is connected to the sensor switches on the pump and it provides water to the plant. The motor will get turned off automatically when there is sufficient moisture in the soil.

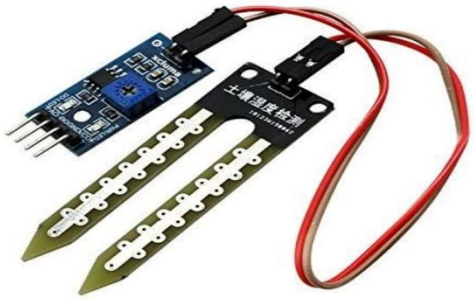


Fig 5. Soil moisture sensor

The soil moisture sensor is used to check whether the soil contain any moist or not. The soil moisture works by the principle of resistance and water level to the gauge. It is analog type sensor and has four pins in it. The LED will glow if the soil contains any moist in it, if not the LED will not glow. It is mainly used for agriculture purposes.

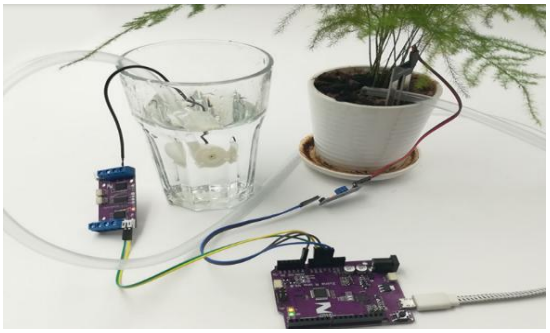


Fig 6. Smart gardening system

D. DHT11 FOR TEMPERATURE AND MOISTURE DISPAY

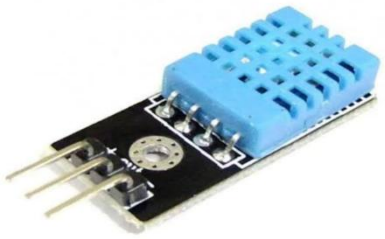
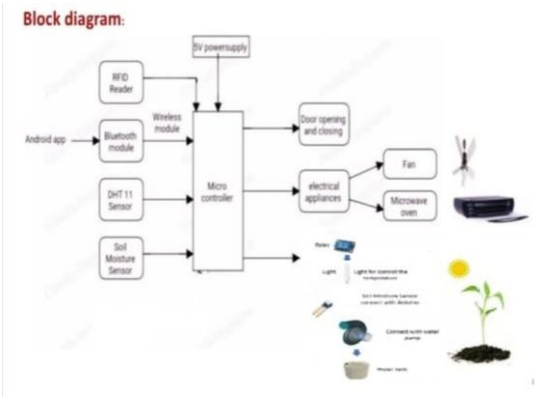


Fig 7. DHT11 sensor

DHT11 is a basic device used to detect temperature and humidity in atmosphere.it is cost efficient and is a digital component and can be easily used. It is pretty accurate with its detections.it has five percent accuracy. It used low amount of current. The temperature and humidity are displayed with the help of lcd display. It is a capacitive type humidity sensor and thermistor. It is connected with the Arduino uno for the output. It measures from 0 – 50 degreesCelsius and 20 to 80 percent of humidity in air.

III.BLOCK DIAGRAM



To implement this project the required hardware components are RFID reader, BluetoothModule, DHT11 sensor and soil moisture sensor is used. RFID reader is used for door opening and closing. With the help of Bluetooth module and android app, the electrical appliances like fan and microwave are controlled. DHT11 sensor is used for the temperature and moisture measurement and the things are displayed in the LCD screen. The soil moisture sensor is used to check whether the soil is moist or not, if not the water is supplied automatically to the soil with the help of motor. The controller used for this project is Arduino uno.

IV.PROPOSEDSYSTEM

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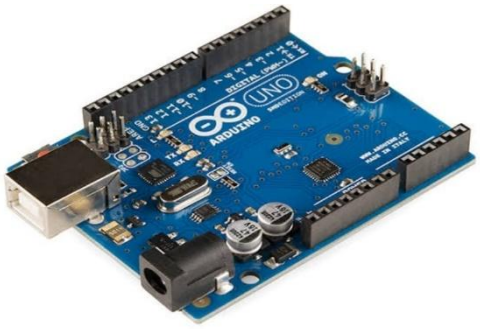

Fig 8. AURDINO UNO(Microcontroller)

V.WORKING

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The RFID is interfaced with Arduino uno for the process of door opening and closing. The RFID tag is read by the reader and the controller provides access for certain tags and access denied for unidentified tags. If the tag is identified by the reader and the signal will be sent to the servo motor, the one end will be connected to the door and other end is connected to the microcontroller. When the signal from Arduino reaches the servo motor it moves according to the instruction given to it.

When the Bluetooth module is connected to the microcontroller Arduino Uno, controlling of electrical appliances like light, fan or AC is made possible with a smartphone app. The control actions are done by the android app. When any instruction given to the module from app by the user, it transmits the signal to the module and to the appliances.

Soil moisture sensor is used for smart gardening for checking the moisture level in the soil, if the water is not sufficient for the plants then the motor is turned on and the water is supplied automatically to the plants and the motor turs off if the water is supplied.
DHT11 sensor is used to measure temperature and humidity present in atmosphere. The temperature and humidity are displayed in the LCD screen.

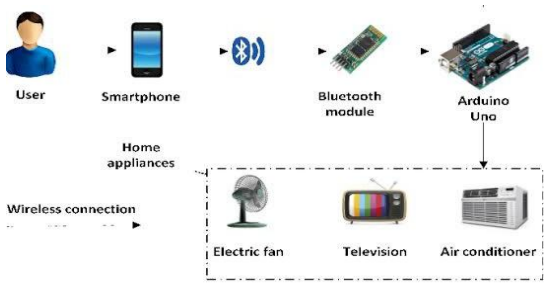


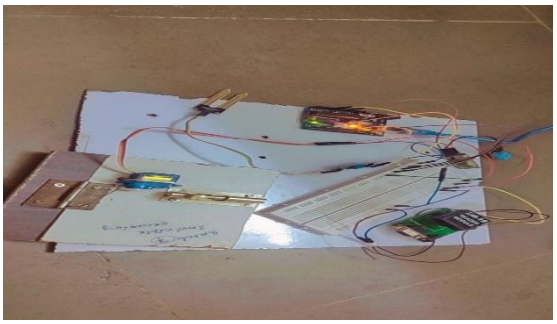
Fig.9 Flow Chart of the System

VI.WEB PAGE DEVELOPMENT

The local app is used to develop an android app for controlling the electrical appliances in the home. The host helps to create an application for giving instructions to the hardware components. The web page contains the specifications of the appliance which is controlled by the application.

VII.RESULT

When the microcontroller is connected to the program with RFID, the result has been read as the output using which automatic door opening and closing system has been implemented with the help of servo motor. In Bluetooth module we observed that time consumed in executing a command is totally fast which shows the uniqueness of this system. The gardening is also checked with both soil moisture sensor and DHT11 sensor and the output has been seen.



VIII.CONCLUSION

The home automation system consists of ArduinoUno microcontroller, Bluetooth module HC-05, RFID and relay circuits. WIFI is used for communication between the smartphone and the microcontroller used. This paper proposes user friendly, accessible and cost-efficient solution. This system mainly provides security to our home. Hence we can conclude that the control and monitoring of the home appliances and gardening has been implemented. Finally, we conclude that this type of systems can be implemented for the security of our home and smart gardening is really one cool technique to turn on and off the water automatically from anywhere.

IX.FUTURESCOPE

In the past decades, the need and scope for automation has been increasing and automation has more potential than it is being used now. Due to modernization and technological development, new ways of automation like face detection unlock has been evolved and its applications has also been increased. The main advantage of home automation is to make homes user friendlier for the children and elders. In future automation can be further applied to a lot more than we can ever imagine.

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