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# Sensing and Actuating Multiple Tasks Using Iot Lakireddy Bali Reddy College Of Engineering (Autonomous)

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**Abstract:** *The main objective of this article is to develop a Home Automation System using Android mobile with Bluetooth Module. Nowadays people are expecting to control the home appliances through remote control. This expectation is fulfilled by our advanced technology. In this article we are using Bluetooth and Android OS to develop a smart home. This system provides ideal solution to the problems caused in situations when a wired connection between a remote appliance/device and the control unit might not be feasible. This paper put forwards the implementation of home automation using Arduino microprocessor and Android smartphone. Home appliances are connected to the microprocessor and communication is established between the Arduino and Android mobile device or tablet via Bluetooth module. It also describes the hardware and software architecture of system, future work and scope. The proposed prototype of home automation system is implemented and tested on hardware and it gave the exact and expected results.*

**Keywords-Home automation; Smartphone; Arduino; .Bluetooth; Home appliances.**

## 1. INTRODUCTION

Home automation system is use of information technologies and control system to reduce the human labour. The rapid growth of technologies influence us to use smartphones to remotely control the home appliances. An automated devices has ability to work with versatility, diligence and with lowest error rate .The idea of home automation system is a significant issue for researchers and home appliances companies. Automation system not only helps to decrease the human labour but it also saves time and energy. Early home automation systems were used in labour saving machines but now a days its main objective is provide facilities to elderly and handicapped people to perform their daily routine tasks and control the home appliances remotely. The Allied Business Intelligence (ABI) research reports that almost l.5 million automatic home appliances were installed in United States of America (USA) during 2012 and their increasing rate is 45.2%. In wireless based home automation system different type of technologies such as ZigBee, Global System for Mobile (GSM) , General Packet Radio Service (GPRS) , Infrared, wireless fidelity (Wi-Fi) and Bluetooth are used, each technology has their own pros and cons. A Bluetooth based wireless home automation system can be implement with a low cost and it is easy to install in an existing home. Bluetooth technology has ability to transmit data serially up to 3 Mbps within a physical range of 10m to 100m depending on the type of Bluetooth device.

The proposed method presents the design and implementation of a robust, low cost and user friendly home automation system using Bluetooth technology. The design of proposed method is based on Arduino board, Bluetooth module, sensors and smartphone application. Bluetooth module HC-05 is interfaced with Arduino board and home appliances are connected with Arduino board via relay. Smartphone application is used for serial communication between smartphone and Bluetooth module which is further connected with Arduino board. Proposed method has ability to not only remotely control the appliances but it also monitors the sensors. Nowadays most of conventional home automation systems are designed for elderly, handicapped people or for any special purpose. The proposed method is not only suitable for elderly and handicapped people but it also provides a general purpose home automation system, which can easily implement in existing home.

## 2. LITERATURE REVIEW

[1] Deepali Javale: presented the design of home automation and security system using Android ADK which is based on a standalone embedded system board Android ADK (Accessory Development Kit) at home.

[2] Akanksha Singh: presented the paper on how to control home appliances, safety & security system using GSM technology by using android application through android mobile phone. It can control the appliances even in the absence of android phone by sending a normal sms.

[3]Prof. R.S. Suryavanshi: discussed a approach in which a model of Home Automation System Using Android and wifi technology, which really offers easy and really much awaited Home Automation Systems (HAS).

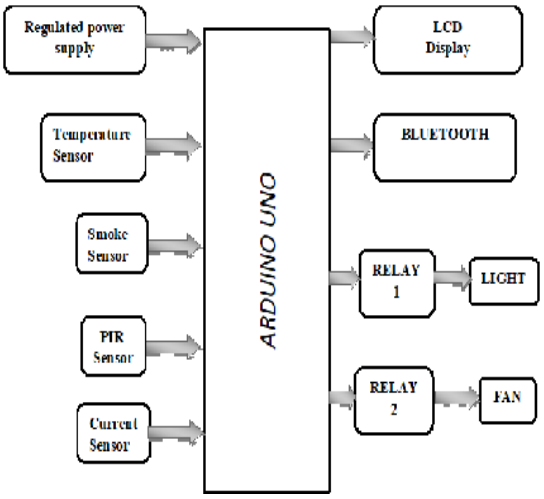
[4]Niraj R Chauhan: proposed a system in which if the interrupt is occurred put in the system sends sms to user however user is enable to reply the sms in such a condition associate in nursing intelligent software package can reply sms.
[5]Satish Palaniappan: explained this paper survey of all existing system such as Wi-Fi, GSM, Bluetooth, Zigbee and compare the available feature. Based on all the system surveyed, is identified as ideal system for home automation with remote access.

## 3. SYSTEM DESCRIPTION.

The proposed system has two main parts hardware and software. The hardware part consists of three main hardware components smartphone, Arduino board and Bluetooth module. Software part consist of Arduino integrated development environment (IDE) and Bluetooth terminal smartphone application which is used for wireless communication between smartphone and Arduino board.

## 4. METHODOLOGY

The block diagram of proposed system is represented in below figure. It consists of temperature sensor, Smoke sensor, Passive Infrared sensor, Current sensor, Relays and Load. The sensors are attached to Bluetooth module via Arduino board, which measures the room temperature, gases present in our surroundings, detect the motion of objects, measure the current up to threshold value. These sensed data is transferred to the Arduino board for further processing before transmitting through wireless Bluetooth network.



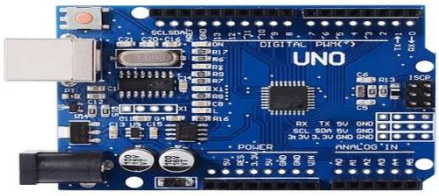

After initializing sensor nodes, each of the sensors will continuously check for the data. Every node after obtaining the real time data, it will send the data to Bluetooth module via Arduino UNO board.

## 5. HARDWARE ARCHITECTURE

The proposed home automation system contains hardware components are smartphone, Arduino board and Bluetooth module. Smartphone is used to communicate with Arduino board using a smartphone application and Bluetooth technology. In this research work Bluetooth module HC 06 and Arduino Uno are used for hardware implementation.

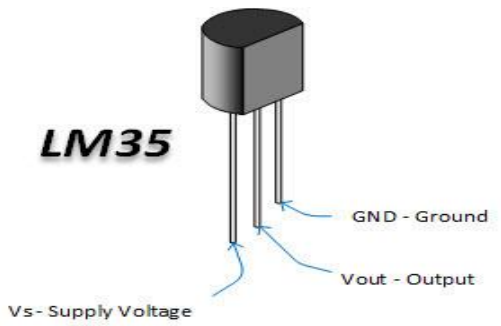
### ARDUINO

Arduino is a prototype platform (open-source) based on an easy-to use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE, which is used to write and upload the computer code to the physical board.




### TEMPERATURE SENSOR (LM 35):

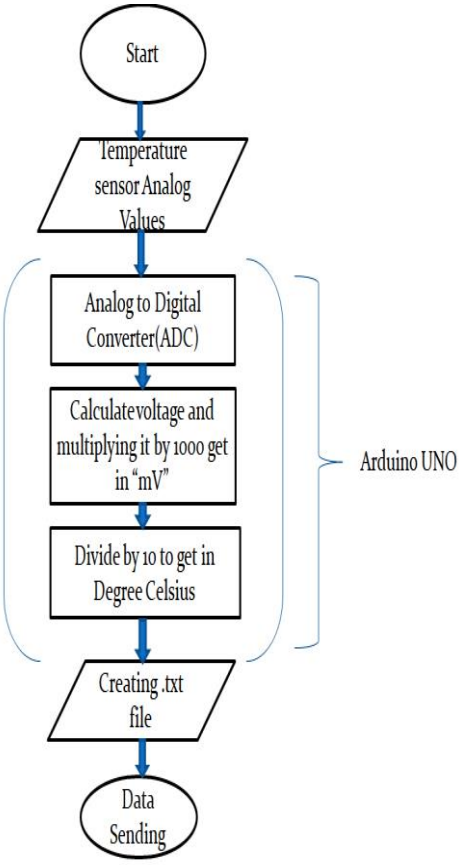
The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in Centigrade) .You can measure temperature more accurately than a using a thermistor. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.




### Pin Description:

| Pin No | Function | Name |
|---|---|---|
| 1 | Supply voltage; 5V (+35V to -2V) | Vcc |
| 2 | Output voltage (+6V to -1V) | Output |
| 3 | Ground (0V) | Ground |

**FLOW CHART**

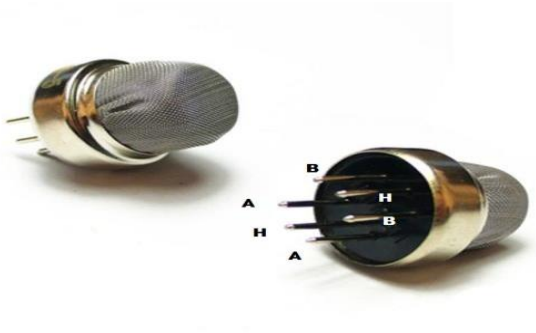



**LIQUID CRYSTAL DISPLAY**

A liquid crystal display or LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology.

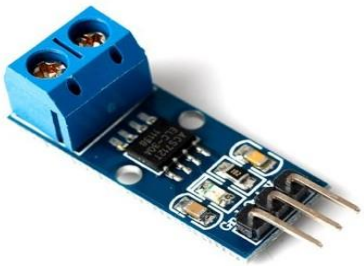
**SMOKE SENSOR**

MQ6 gas sensor can be used to detect the presence of LPG, butane gas, it is low cost and suitable for different application. Sensor is sensitive to flammable gas and smoke. Gas sensor is given 5 volt to power it. Gas sensor indicate gas by the voltage that it outputs .More gas more output.




**CURRENT SENSOR**

The Allegro ACS712 provides economical and precise solutions for AC or DC current sensing in industrial, commercial, and communications systems. The device package allows for easy implementation by the customer. Typical applications include motor control, load detection and management, switched-mode power supplies, and overcurrent fault protection. The device is not intended for automotive applications. For the automotive grade version, see ACS714.



**PIR SENSOR**

PIR sensor detects a human being moving around within approximately 10m from the sensor. This is an average value, as the actual detection range is

between 5m and 12m.PIR are fundamentally made of a pyro electric sensor, which can detect levels of infrared radiation. Most PIR sensors have a 3-pin connection at the side or bottom. One pin will be ground, another will be signal and the last pin will be power. Power is usually up to 5V. Sometimes bigger modules don't have direct output and instead just operate a relay which case there is ground, power and the two switch associations. Interfacing PIR with microcontroller is very easy and simple. The PIR acts as a digital output so all you need to do is listening for the pin to flip high or low.

## 6. CONCLUSION

It gives basic idea of how to control various home appliances and provide a security using Arduino Uno. The cost of smart homes technology is for some people an argument against the choice of such installations. This project uses low cost off the shelf components. So the overall implementation cost is very cheap and is affordable by a common person. This low cost system is designed to improve the standard living in home. The home automation using Internet of Things has been experimentally proven to work by connecting simple appliances to it. These appliances were successfully controlled remotely through the internet. The designed system instigates a process according to the user's requirements, for example switching on a fan when it gets hot. Sensors can be implemented to store data which can later be used to analyse the system at hand .The project we have undertaken has helped us to gain a better perspective on various aspects related to our course of study as well as the practical knowledge of electronic equipment's and communication. From the convenience of a mostly used simple cell phone, a user is able to control and monitor virtually any electrical devices. This makes it possible for users to assured that their belongings are secure and that the TV and other electrical appliances was not left running when they left the house to just list a few of the many uses of this system. The final or end product will have a simplistic design making it easy for users to interact with.

## 7. FUTURE SCOPE

For future work, some recommendation can be made like adding motion sensors for automatic turning ON/OFF of lights, fans depending upon the position of user, wireless connectivity can be added to system, and schedulers can be added for controlling home appliances. The whole system can be fabricated as economic commercial hardware package. The concept of this home automation can also be used for grid automation in smart grids in power systems.

The next phase for the Home automation market will occur based on a few key improvements in the technology available in Automation, such as improvement in Wireless Automation solutions as well as lowering of price points as the market begins to accept Home automation usage in larger volumes.

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