



# **A Review on Android Based Home Automation System**

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**ABSTRACT:** The main aim of this project is to control the home application remotely using Android smart phones with an arduino microcontroller. Now a days automation got importance due to human efficiency and comfort. Usually conventional switches are located at different place in home and person has difficult to go every time for their operation. So to avoid manual operations this home automation system has been developed. This system control the appliances like light, fan, bulb etc. by entering the selected key for corresponding load from Android phone and this system also shows the reading of water tank level, room temperature, distance measurement on the Android application of smart phone.

**KEYWORDS:** Home Automation, Arduino, Android smart phone, sensor

## **I.INTRODUCTION**

Home automation is a topic that has been around for many years. It includes everything that you can imagine to control and automate your home. The most widely spread example is the alarm system of your home. Motion sensors, contact sensors, and the central device that orchestrates your alarm system are generally the main components of any home automation system. There are countless devices that are available for home automation. You can buy complete home automation devices from a lot of stores, and even get them installed in your home.

However, many of these systems are very expensive, impossible to be customized for your own needs, and have outdated user interfaces. Early home automation began with labor-saving machines. Self-contained electric or gas powered home appliances became viable in the 1900s with the introduction of electric power distribution and led to the introduction of washing machines (1904), water heaters refrigerators, sewing machines, dishwashers, and clothes dryers. In 1975, X10 the first general purpose home automation network technology was developed. It is a communication protocol for electronic devices. It primarily uses electric power transmission wiring for signaling and control, where the signals involve brief radio frequency bursts of digital data and remains the most widely available. By 1978, X10 products included a 16 channel command console, a lamp module, and an appliance module. Soon after came the wall switch module and the first X10 timer.

The past decade has seen significant advancement in the field of consumer electronics. Various intelligent appliances such as cellular phone, air conditioners, home security devices, home theaters, etc., are set to realize the concept of a smart home. They have given rise to a Personal Area Network in home environment, where all these appliances can be interconnected and monitored using a single controller. Home automation involves introducing a degree of computerized or automatic control to certain electrical and electronic systems in a building. These include lighting, temperature control, Level of tank etc This project demonstrates a simple home automation system which contains a remote mobile host controller and several client modules (home appliances). The client modules communicate with the host controller through a wireless device such as a Bluetooth enabled mobile phone, in this case, an android based Smart phone. In extreme installations, rooms can sense not only the presence of a person but know who that person is and perhaps set appropriate lighting, temperature and Door security taking into account day of week, time of day, and other factors. Other automated tasks may include setting the air conditioning to an energy saving setting when the house is unoccupied, and restoring the normal setting when an occupant is about to return. Some practical implementations of home automation are for example when a level sensor detects Threshold points of level measurement, then level LED of the house will blink to give indication of level of tank.

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 11, November 2016

## II. SYSTEM BLOCK DIAGRAM

- Controllers
- Sensors
- Home appliances
- Communication Channel

In Home Automation System Microcontroller is heart of system. It is Interfaced with Sensors and Home appliances. Here in this project we interface sensors like Temperature sensor, Proximity IR sensor, Passive Infrared motion sensor, Ultrasonic sensor and Home appliances like Fan , Lamp, RGB Led, Touch screen . For wireless communication between microcontroller and Android Phone use Bluetooth. It use as communication channel between remote phone and microcontroller. Using android application user can give commands by button touchpad or by voice commands. In android application that commands are encoded by ASCII values that send to microcontroller. Microcontroller receive that and decode it then compare with predefined program and gives respective output. It also gives notification on TFT screen and android application about status of all home appliances. Sensor interfaced with controller gives its measurement on android application and touch screen display. so user can easily access all home appliances with comfort.

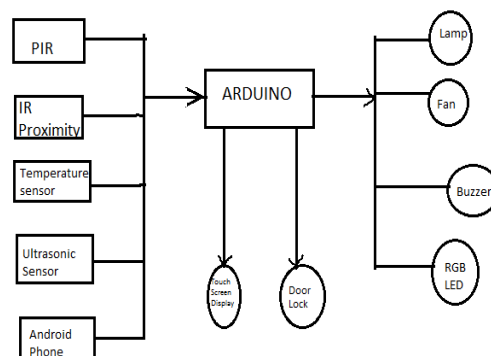


Fig.1 Block diagram

## III. DESCRIPTION OF CIRCUIT DIAGRAM

### Arduino Mega

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for Arduino Mega The Arduino Mega 2560 is an update to the Arduino Mega, which it replaces. Getting Started You can find in the Getting Started section all the information you need to configure your board, use the Arduino Software (IDE), and start tinker with coding and electronics.

### Bluetooth Module

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices and building personal area networks (PANs). Range is approximately 10 Meters (30 feet). These modules are based on the Cambridge Silicon Radio BC417 2.4 GHz Bluetooth Radio chip. This is a complex chip which uses an external 8 M bit flash memory.

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## Ultrasonic sensor

Ultrasonic Ranging Module HC - SR04 Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.

## Passive infrared sensor

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors.

## Temperature sensor

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of C at room temperature and C over a full 55C to 150C temperature range.

## IR Proximity Sensor

The TSOP17.. Series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter. The demodulated output signal can directly be decoded by a microprocessor. TSOP17.. is the standard IR remote control receiver series, supporting all major transmission codes.

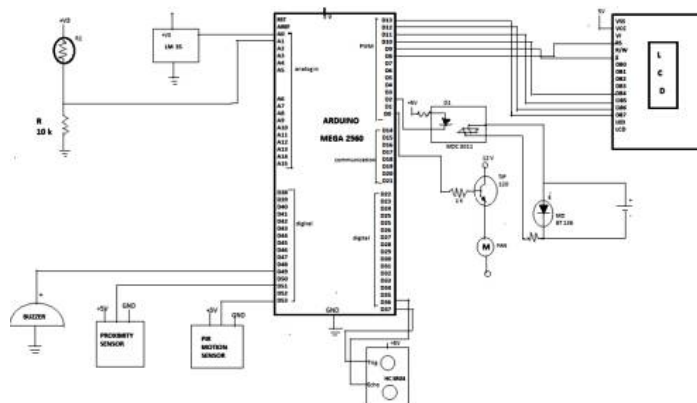


Fig.2 Circuit Diagram

## IV. CONCLUSION

The home automation system has been experimentally proven to work satisfactorily by connecting sample appliances to it and the appliances were successfully controlled from a wireless mobile device. The Bluetooth client was successfully tested on a multitude of different mobile phones from different manufacturers, thus proving its portability and wide compatibility. Sensors like proximity, temperature, Level plays important role to enhance automation level. This project will not only provide convenience to the common man but will be a boon for the elderly and disabled.

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ISSN (Print) : 2320 – 3765  
ISSN (Online): 2278 – 8875

## International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 11, November 2016

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