

# IOT BASED HOME CONTROL AND MONITORING SYSTEM USING ARDUINO AND ANDROID BASED SMART PHONE

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**ABSTRACT:** In this project we are going to design the home control and monitoring system. This system is developed by using an embedded micro web server, with IP connectivity for accessing and controlling electronic devices and applications remotely by using the android based smart phone. In order to operate that system we design the app. This system does not require a dedicated server PC with respect to similar system and provides communication to control and monitor the home environment with more than just switching functionality. In this system, the devices like Fan, Tube light, CFL and sensors are integrated with the proposed home control system

**KEYWORDS:** Histogram Equalization, EBPA, PDF and CDF

## I. INTRODUCTION

The Internet of Things is the internetworking of the physical devices, vehicles, embedded items placed within the buildings, actuators, sensors and network connectivity that are intelligently connected to the Internet and allow the devices, human being and things to collect and exchange the information or data. The development of Internet of Things will revolutionize sectors like automation, transportation, energy, healthcare, financial services and nanotechnology. IOT can also be applied to smart homes to provide the comfort, to improve the quality of life and intelligence.

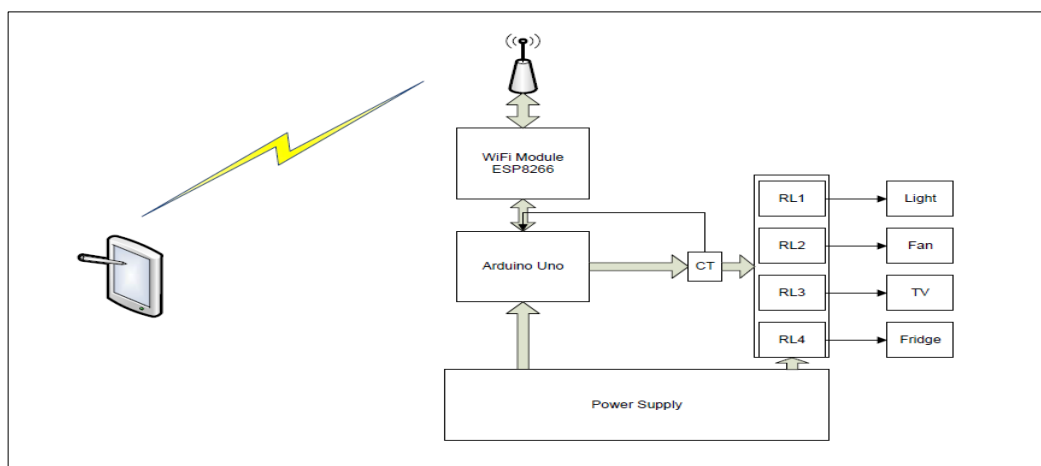
Now anyone, from anytime and anywhere can have connectivity and easily control the electronic devices. Different devices and the appliances in the home such as lightning, air condition, home security and entertainment systems are now being connected with the internet so it can be remotely controlled using the smart phones or tablets. Not only devices can be controlled, but home environment can also be continuously monitored for maintaining certain desired amount of energy consumption.

Hence, this will results the cost reduction and energy saving. This paper shows the system which is developed by using embedded micro web server, with IP connectivity for accessing and controlling the devices and appliances remotely using android based smart phone app.

## II. RELATED WORK

Now days, home automation is widely used because it provides comfort, power saving and security to its users. This system is developed to improve the quality of life of elderly and handicapped people. There are various wireless technologies which supports the remote data transfer, sensing and control which increase the intelligence in the home. The studies in have presented Bluetooth based home automation system using Android smart phone without internet controllability. The devices are physically connected to a Bluetooth sub-controller which is then accessed and controlled by a smart phone using built in Bluetooth connectivity. However due to limited ranges of operation (maximum up to 100m) the system is unable to cope with mobility and can only be controlled within the vicinity.

The Wi-Fi based home control system using pc based web server which manage the connected home devices. Similar design in which a dedicated web server, database and a web page have been developed to interconnect and manage the devices with the internet. The disadvantages of the system are a high end personal computer has been utilized which not only increases the energy consumption and development and hosting of web pages which also add to the cost. . A GSM based communication and control for home appliances has also been presented where different AT commands are sent to the Home Mobile for controlling different appliances. The drawback of this system is that users are not provided with a graphical user interface and users have to remember different AT commands to control the connected devices.



**Figure 1: Automated System**

### III. PROPOSED WORK

System implementation is divided into two part first is application and another is embedded. In application part it consist mobile phone with android application through which person can control the home appliances. Second part consist whole system with arduino board and Wi-Fi module at home gateway. To successfully communicate between remote user and the Home Gateway, configuration stage and sensor control stage layers have been implemented on the Arduino Uno.

Whenever the Home Gateway has been initialized, it enters into state until any command is received from the remote user. Upon successful reception of commands from the Smart phone app, it's decoded and appropriate control action is taken. These actions can be sensing the current transformer output. Initially the loads are switched on depending on the feedback of current transformer user knows about whether the load is either on or off. According to the feedback user gives the command to turn on or off the respective load.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (*shields*) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. Most Arduino boards consist of an Atmel 8-bit AVR microcontroller (ATmega8, ATmega168, ATmega328, ATmega1280, ATmega2560) with varying amounts of flash memory, pins, and features. The 32-bit Arduino Due, based on the Atmel SAM3X8E was introduced in 2012. The boards use single or double-row pins or female headers that facilitate connections for programming and incorporation into other circuits.

**Main part of system**  
Application and Embedded System

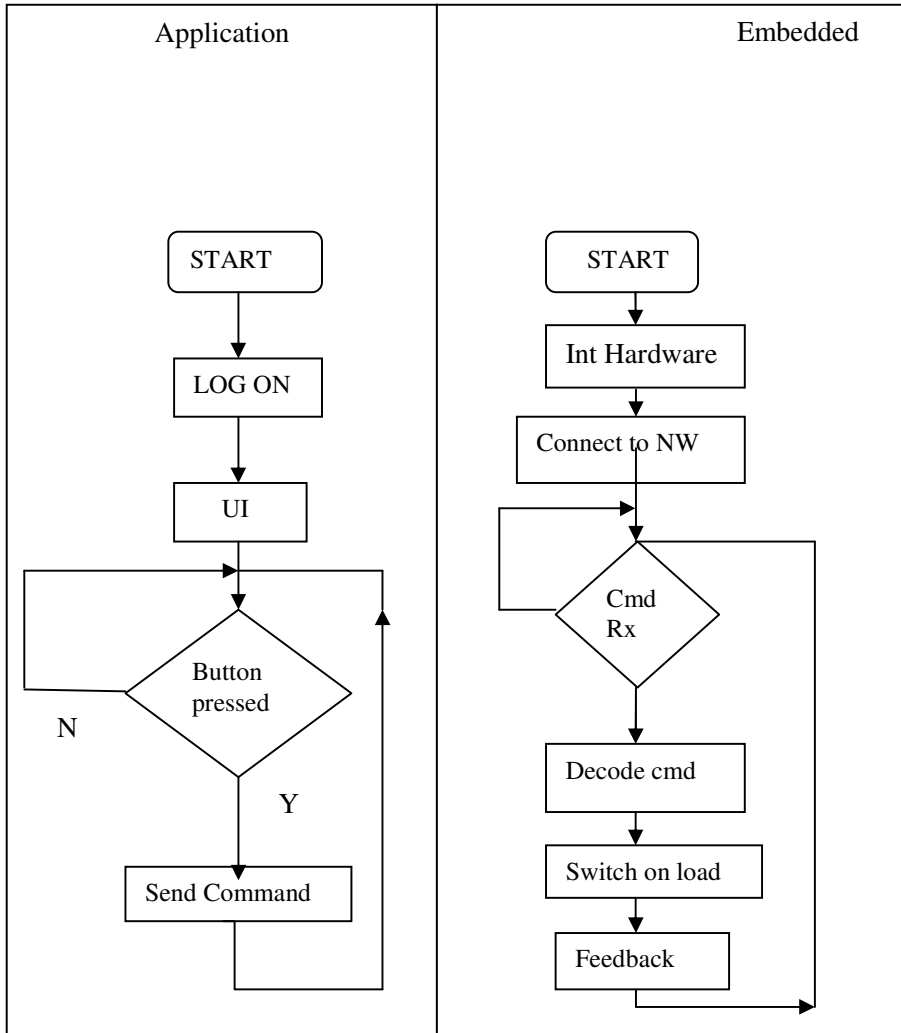


Figure 2: Flowchart of Proposed System

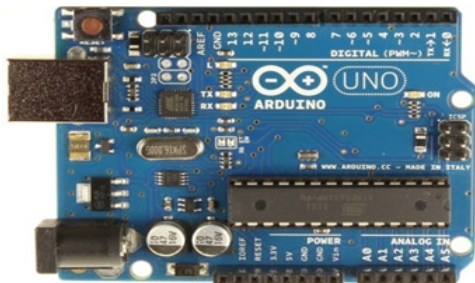


Figure 3: Arduino UNO

The **Arduino** is open-source computer hardware and software company, project and user community that designs and manufactures microcontroller-based kits for building digital devices and interactive objects that can sense and control objects in the physical world. The term open source is define as, there is source code associated with arduino which can be used by any person in the world.

The **Arduino Uno** and Ethernet shield are used to implement the micro-web server for the home gate-way. Home gate-way connected to the internet. The Arduino Uno is an open source microcontroller that uses ATMEGA 328 an Atmel AVR processor which can be programmed by the computer in C language via USB port. Arduino Uno also has on board five analog pin and thirteen digital pins for input and output operation. Ethernet module acts as a bridge to connect the home gate-way to local proxy.

#### **IV. ADVANTAGES**

1. Reduces human efforts
2. Power saving
3. Low cast

#### **V. APPLICATIONS**

1. IOT based home control and monitoring system used to control different home appliances like fan, lights, door, temperature measurement etc.
2. This application can be used to control electronic equipment in industries.
3. It can be used in office application by using android application.

#### **V. CONCLUSIONS**

In this paper, An architecture for low cost and flexible home control and monitoring system using Android based Smart phone is proposed and implemented. The proposed architecture utilizes the communicating between remote user and the home devices. Any Android based Smart phone with built in support for Wi-Fi can be used to access and control the devices at home

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