

# MULTI-FUNCTIONAL HOME AUTOMATION SYSTEM USING IOT

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**Abstract**—In now a day's world the Internet of Things (IOT) hook with our daily life. The Internet of Things helps to peer into the world of war craft of digitization where every smart device, every sensor is connected with the internet and therefore can be accessed the power management system across the universe. The opportunity of IOT is flourishing gradually with new technologies like smart grids, smart homes, smart cities etc. IOT allowances internet connectedness for all kind of physical objects and devices. Virtualization of different types of system is becoming trend in now a day's world that allows performing without direct physical interaction. The combination of intelligent devices and high speed internet makes easier to perform multi- tasking smoothly without the constraint of distances. Here we try to implement such kind of IoT device which communicate all kind of home instruments through a smart device. This device creates communication through internet. Where one person enters the room automatically it counts and send the notification to the user, and the appliances will work accordingly.

## INTRODUCTION--

The concept of Internet of things (IOT) was popularized by the growth of the widely used global network known as the internet along with the deployment of omnipresent computing and mobiles in smart objects which brings new convenience for the creation of innovative solutions to various aspects of life. The concept of Internet of things (IOT) generates a network of objects that can communicate, interact and cooperate together to achieve a common goal. IoT devices can enlarge our daily lives, as each device stops acting as an individual device and become part of an entire full connected system. This provides us with the resulting data to be evaluated for better decision making, tracking our businesses and keeping an eye on our properties while we are far away from them. As the archetype of IOT is growing, it is stepping into every aspect of our lives [1]. This leads to an easier life through extended range of applications, such as electronic health care solutions and Smart city concept. The concept of Smart city aims to bringing out a better use of resources, enhancing services quality offered to the citizens, and compressing costs of the public administrations. Another application is home automation which is the main spot light of this project. Wireless Home automation is the facets of this project. The recently built mock-up of the system sends alerts if any sort of human movement is sensed near the entrance of hishouse.

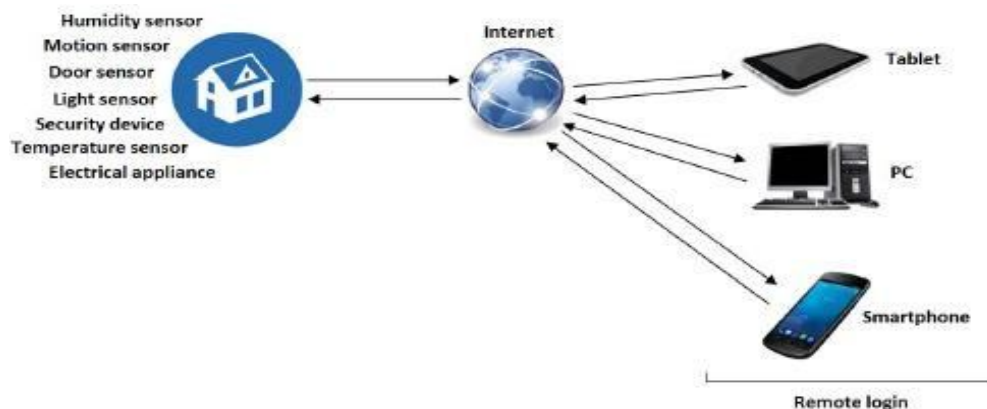


Fig-1: Proposed IoT framework for reconfigurable smart sensor interface.

Related Work—



Automation performs an increasingly crucial role in daily experience and global economy. Engineers endeavor to blend automated devices with numerical and organizational instruments to create complex systems for a expeditiously expanding range of applications and human activities. The approach of home automation has been around since the late 1970s. But with the improvement of technology and smart services, people's expectations have changed a lot during the development of time to perfectly turn the conventional house into smart home, and also imagine that what a home should do or how the services should be provided and accessed at home to became a smart home and so has the idea of home automation systems [1][2]. A home automation system means to set aside the end users to manage and handle the electric appliances. If society looks at numerous home automation systems over time, they have always used to equip, efficient, convenient, and safe ways for home denizen to access their homes. Regardless of the change in user's hope, growing technology, or change of time, the appearance of home automations various existing, acknowledged home automation systems are planted on wired communication such as Arduino based and raspberry pi based home automation systems. This does not mien a problem until the system is programmed well in advance and installed during the physical development of the building. But for already existing buildings the construction cost goes very high. In contrast, Wireless systems can be of enormous help for automation systems like Bluetooth, Wi-Fi and IOT based home automation systems [4]. With the improvement of wireless technologies such as Wi-Fi, cloud networks in the modern past, wireless systems are used every day andeverywhere.

#### RELATED TECHNOLOGY—

**Bluetooth Based Home Automation System Using Cell Phone:** In Bluetooth based home automation system the home gadgets are linked to the Arduino BT board at input output ports using relay. The program of Arduino BT board is established on high level communicative C language of microcontrollers; the network is made via Bluetooth [5]. The password protection is given so only empowered user is allowed to fetch the appliances. The Bluetooth connection is well-established between Arduino BT board and phone for wireless communication. In this system the python script is used and it can install on any of the Symbian OS environment, it is compact. One circuit is formed and implemented for receiving the feedback from the phone, which point out the status of the device.

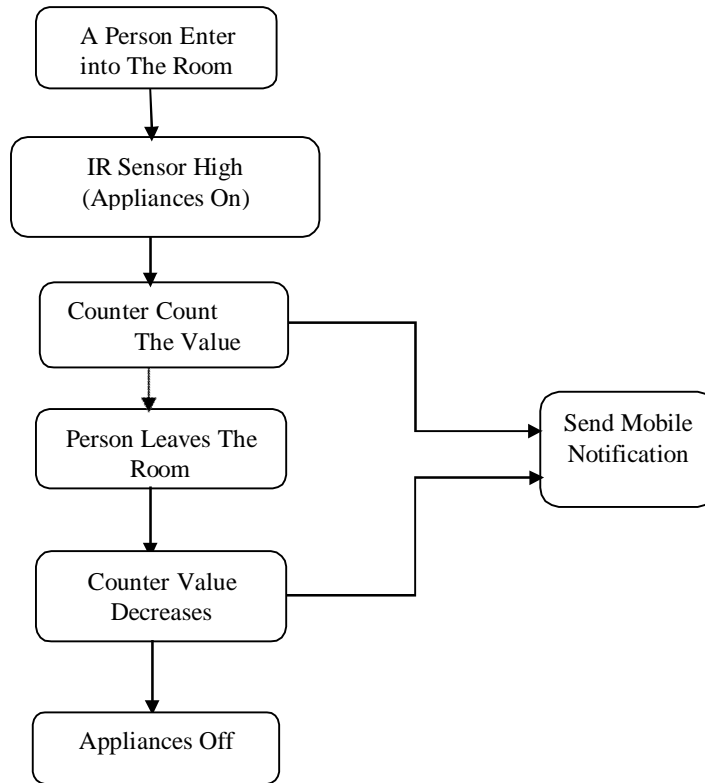
**Zigbee Based Home Automation System Using Cell Phone:** To keep an eye and control the home appliances the system is designed and implemented using Zigbee. The device performance is record and store by network administrator. For this Wi-Fi network is used, which uses the four switch port standard wireless ADSL modern router. The network SSID and security Wi-Fi parameter are configured. The message for security aspiration first process by the virtual home algorithm and when it is declared safe it is re-encrypted and forward to the real network instrument of the home[8][9]. On Zigbee network, Zigbee controller sent messages to the end. The safety and security of all messages that are received by the virtual home method. To reduce the expense of the system and the intrusiveness of respective installation of the system Zigbee communication is helpful.

**WI-FI Based Home Automation Using Cell Phone:** Wi-Fi based home automation system mainly consist three modules, the server, the hardware interface module, and the software package. The figure shows the system model layout. Wi-Fi technology is used by server, and hardware Interface module to communicate with each other. The same machinery uses to login to the server web based application. The server is associated to the internet, so remote users can access server web based application through the internet using compatible web browser. Software of the latest home automation system can be split into server application software and Microcontroller (Arduino) firmware. The Arduino software, construct using C language, using IDE comes with the microcontroller itself. Arduino software is liable for gathering events from connected sensors, then applies action to activators and preprogramed in the server. Another job is to report and record the history in the server Data Base. The server application software kit for the proposed home automation system is a web based application assembled using asp.net [8]. The server application software can be accessed from internal network or from World Wide Web if the server has real IP on the internet using to keep log of home automation system instruments, we choose to use XML files to save the systemlog.

**Home Automation Using Android ADK:** The devices of home are associated to the Android Development Kit and the Connection is well-established between the Android device and ADK. The devices of house are connected to the input/output ports of the board (EMBEDDED SYSTEM) and their current position will have passed to the ADK. The microcontroller board (Arduino ADK) is based on the ATmega2560. It has a USB host connection to associate with Android based phones, and that is based on the MAX3421e IC. The two important features of Android Open Accessory

Protocol 2.0(AOAP) are as follows: It has audio output that is from the Android device to the component and it also support for the component serves as one or more Human Interface Devices (HID) to the Android device. This paper depends upon Android and Arduino platform in which both are FOSS (Free Open Source Software)[2][8]. Including motion sensors for safety systems will detect an unauthorized action and it will automatically notice the user through cell phone or the securitysystem.

**PROPOSED PROTOCOL—**



**Fig-2: Proposed Protocol.**

**Proposed Protocol Description-**The IR sensors should be placed in the main entrance door. When a person enters the home then the IR sensor detects the movement and the home appliances will start working accordingly. If any person left the room then sensors detect the movement and the counter decreases the value. When counter gets '0' then the appliances will stop working accordingly. When the room will be emptied the user will be notified via mobile application.

**PROPOSED WORK-**

Step-1: IR Sensors should be placed in the main entrance door.

Step-2: When a person into the home then IR sensors detect the movement and count the value and send mobile notification. Step-3: The appliances will start working accordingly.

Step-4: Again any person leaves the room then IR sensors detect the movement and counter value will be decreased.

Step-5: When counter '0' or NULL then the appliances will stop working accordingly.

Step-6: When the room will be emptied, the user will be notified via mobile application.

**ACCESSORIES USED-**

IR SENSOR: An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings.



**Arduino:** Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices.

**Proximity Sensor:** A proximity sensor is an electronic sensor that can detect the presence of objects within its vicinity without any actual physical contact.

**Relay Module:** Relay Module is a hardware device used for remote device switching. With it you can remotely control devices over a network or the Internet.

**Motion Detector:** A motion detector or sensor is the linchpin of your security system, because it's the main device that detects when someone is in your home when they shouldn't be.

**Male female connector:** These are mainly used to connect the devices.

**ULN2003:** ULN2003 is a high voltage and high current Darlington array IC. It contains seven open collector Darlington pairs with common emitters. A Darlington pair is an arrangement of two bipolar transistors.

**L7805:** 7805 is a three terminal linear voltage regulator IC with a fixed output voltage of 5V which is useful in a wide range of applications.

#### **BENEFITS OF THE MODEL-**

**Safety:** The ability to control home appliances with your fingertips anywhere you are will add safety in your home. You can make sure appliances are off when it's needed to be off and on when it's needed to be on.

**Security:** The ability to detect unexpected entry of any person or any animal. User can be alerted each time someone enters in the room. User can get notification of any entry especially when user are not in home.

**Saves Times:** People are living in a much paced environment, People don't have any time to think about our home. User can save time going back to our home and make sure everything is order or not with home automation, like if the kids close the door from school or turn on the lights when you get home.

**Save Money:** User can save more money by using this technology. Home appliances are used only the required time so extra bills will not to be paid.

#### **FUTURE WORK:**

We have seen there are some home automation technology already present in the society like Bluetooth Based Home Automation, Zigbee based home automation, Wi-Fi Based Home Automation and Home Automation Using Android. All of these kind of technology work in small ranges but our Multi-operational Home Automation System using IoT has overcome this defect. Our Home Automation System can be upgraded in future in some aspect like notification system can be upgraded, more sensors can be used for small activities and camera can be installed for video or photo notification.

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