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Remote Access to Home Appliances: A Survey

N.B. Gawade[1*], S. B. Shinde[2]

[1*]Dept. of Electronics and Telecommunication, JSPM NTC, SPPU, India
[2]Dept. of Electronics & Telecommunication, JSPM NTC, SPPU, India

[*]*Corresponding Author: nileshgawade.246@gmail.com, Tel.: +91-9960664671*

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***Abstract*—** Now everything has evolved under Internet of Things. This domain embodied in a wide spectrum of networked products, systems, and sensors, which take advantage of advancements in computing power, electronics miniaturization, and network interconnections offering new ventures undiscovered previously. The IoT is the inter connection of physical devices (aka smart devices) equipped with electronics, software, sensor, actuators, and network connectivity enabling different components for data collection and exchange. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure enabling direct embodiment of the physical world into digital world, leading to improved efficiency, accuracy and economic benefit apart from reduction in human intervention. The main objective of proposed system is to provide automation system with low cost & effective solution to electronic appliances.

***Keywords*—**IOT,Webserver,BeagleBoneBlack,AndroidApps,Smartphone.

I. INTRODUCTION

Internet of Things represents a general concept for the ability of network devices to sense and collect data from different sources and sharing procured data across the Internet for processing where it is utilized for various purposes. This refers to commercial applications of technology to manufacturing. But the IOT is not limited to industrial applications. Now days IoT has become a talk of every desk. It has changed the perception of internet to IoT. Implementation of IoT based devices makes use of hardware and software components. Interface with the physical world is done using dedicated hardware components. Microcontrollers are used to execute software that interprets inputs and controls the system. IoT devices often use an OS supporting the interaction between the software and the microcontroller.

In the market, many automation systems are existing, but with a restriction on the communication range. The proposed system is focusing on extending communication range. Suppose we can use home automation system & communication medium is Bluetooth, then we can operate this system in only limited region. But instead of Bluetooth we can use the internet medium and then there is no issue of communication range. Proposed system consists of BBB is the heart of our system and acts as a server. At client side there is Android Apps which is installed in smart phone. With the help of internet communication take place between the smart phone and server. At server side there is electronic circuit which can operate according to the server instruction. If server gives high signal to electronic circuit then relay will ON and Electronic appliances Work.

Sensor: These are electronic devices which measure the physical quantity and generate analog output according to set conditions.

1. Temperature sensor: These sense the temperature of that region and converted to suitable electrical format. It may be electrical current or voltage. In every sensor have input circuitry and amplifier which can apply the output signal at a certain level.

2. Proximity sensors: These sensors detect motion and proportionally produce electrical output voltage. There are many sensors available in the market like IR sensor, level sensor, Chemical sensor, Gas sensor etc.

Actuator: Machine components which is responsible for moving or controlling system is called as actuators.

II. RELATED WORK

In [1] proposed system using IoT like, Smartphone, smart car, smart home, smart city. There are five such research fields: IOT, Mobile computing, Pervasive Computing (PC), Wireless Sensor Networks (WSN), and most recently, Cyber Physical Systems (CPS). The smart world vision involves much of computer science, computer engineering, and electrical engineering. Greater interactions between these communities will accelerate progress. Here [1] they have

explained 8 topic areas: massive scaling, architecture and dependencies, knowledge creation and big data, robustness, openness, security, privacy, and human-in-the-loop. One future vision suggests IoT has become a utility with enhanced sophistication. This will result in qualitatively different lifestyles than today.

In [2] proposed a system which was based on ARM 7 wireless sensor network parameter of environment. The parameters include CO2, Temperature, Humidity, Intensity, Carbon monoxide etc. The hardware likes ADC which can convert analog data in to Digital, and given to the controller part, the controller can process on that data and given to the DAC which is digital to analog converter. Finally this data is transfer over the medium with the help of wireless sensor network. At receiver side there is receiver which can receive this information and given to the ADC, which convert it in to digital format and then given to processor. The ARM 7 can perform operation on that data and send this information to the LCD which can display the environmental parameter on LCD.

In [3] Now a days air pollution is increased due to carbon dioxide generated by vehicles, factory etc. In this paper they have proposed wireless sensor network concept. There is n number of node which contains sensor related to air pollution. Sensor generating analog output and given to the transmitter here we use zigbee module. They can transmit the analog value over the medium at the receiver side there is receiver which can receive this information. Then this information is uploaded over cloud, and this process is continue unless air pollution control.

In [4] suggested Raspberry pi is a small computer. It uses a many different kinds of processors, so we can't install Microsoft Windows on it but any Linux can be support. Raspberry Pi is also used to surf the internet, to send an email to write a letter using a word processor, but you can to do so much more. Raspberry Pi is the perfect device for computer scientists. It has on chip RAM, ROM, interfacing devices using USB port or LAN. Ra Pi use a SD Flash memory card generally used in digital cameras, configured in a same as a hard drive used in PC. We can interface camera, Wi-Fi module with Raspberry.

In [5] proposed a system in which he suggested to use WSN for wastage management. This project aims at developing a Waste Management Sensor which would reduce the travelling time and cost of garbage collection system by 50%.Travelling cost and time will get reduced as information about dumpsters will be available on web and mobile application which will help the dumping schedule to be optimized. The sensors will detect the level and it will pass the information to the Base Station of the area manager by sending information about the details of Trash, its location. On receiving the information the area manager can immediately deploy a pickup vehicle (GPS enabled) to clean the garbage bin. This can be achieved using wireless sensor network.

In [6] makes use of RFID technology to manage traffic in particular area. Now a day's popularity of vehicles is getting traffic more and more crowded. This is big problem in city to avoid problem this paper work better. In his project they use RFID technology. For every vehicle there is RFID tag. Basically two type of tag active and passive. According to the crowed signal is adjusted by embedded system. After monitoring vehicle count this information in uploaded on to could. Then processor can analyze collected data and according to algorithm they can set signal.

In [7] research was based on A home automation system which is a technology that allows users to control electric appliances. In this paper they have proposed home automation using IoT. There is android application in mobile phone and Wi-Fi connection to these ones. At receiver side there is Wi-Fi module interface with micro controller. And for switching purpose we can use relay driver circuit to ON/OFF electronic devices. When we open application and ON the devices using touch to this applications the signal is transfer over the cloud using Wi-Fi connection. In the same way at receiver there is Wi-Fi module both this module can communicate to each other. With the help of IoT we can control any electronic devices.

In [8] suggested, Beagle bone black is a smallest computer. In BBB there is ARM processor which has 2GB on board flash memory. Beagle bone black support Linux operating system. There are total 92 GPIO pins available for input output operation. Beagle bone black has its own cloud for server application. BBB has on chip ADC and DAC.BBB is one of the best controlling unit in embedded system (IoT).

In [9] makes use of two technology IoT and Cloud computing. This technology used in agriculture and health application. There is n number of sensor node used in agriculture for production. Sensor can give analog output then these values are uploaded on cloud and analyze with standard value and give feedback to the farmer. IoT used for communication medium between them.

In [10] proposed idea of smart city implementation using IoT. According to him we can implement IoT based application from home, society, city, state and country. Smart home automation using Wi-Fi, Bluetooth can be done in IoT.

In [11] proposed a system which will helpful for children protection from kidnapers. There is GPS technique which will display the longitude and latitude point of the location, and show the like streaming on parents mobile phone.

In [12] a new way of communication can be provide between all the things and the people, and also between the devices.

IoT can communicate different level. In this paper they have explains all the concepts of IoT in brief. The important technologies which enable IoT are RFID systems, Sensor networks and intelligence technologies. The potential applications of these technologies are reviewed and the major research issues are described.

In [13] explained the applications of IoT. With the help of wireless sensor network we can communicate various sensor node this many application used in agriculture and smart city for health monitoring system. In agriculture there are different nodes (sensor) which can collect physical parameter and transmitted to server. Server can perform different operation on collected data display on display.

III. METHODOLOGY

Beagle Bone Black: Beagle bone black is a minicomputer and heart of the system. In BBB there is ARM processor which has 2GB on board flash memory. Beagle bone black support Linux operating system. There are total 92 GPIO pins available for input output operation. Beagle bone black has its own cloud for server application. BBB has on chip ADC and DAC.BBB is one of the best controlling units in embedded system . BBB is acting as a server in IoT. It has an Ethernet port. The interfacing of the Ethernet cable is very easy to use. When we connect an Ethernet cable to BBB then it will automatically connected to the internet, but for Wi-Fi connection there is some configuration is required.

Proposed system: The proposed system is home automation using IOT. Following blocks are used in our system.

Smart phone: This is client side remote access. In smart phone, first you have to install application software, which is developed in Java language. In application there are different radio buttons available for different operation Like ON/OFF. When ON radio button is pressed then high signal is send to the cloud using internet. Then cloud is connected to the server using the same.

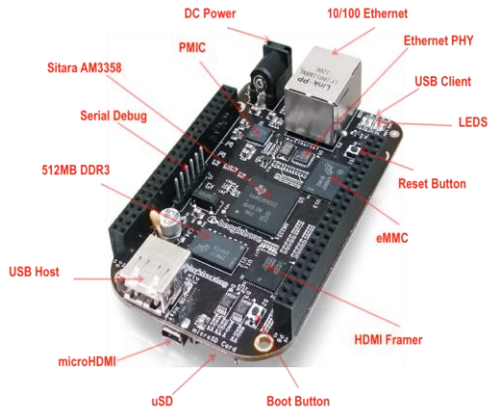

Figure 1. Beagle Bone Black [20]

Server: In our system Beagle Bone Block is a server which can control all the operation of our systems. When sending high signal from client mobile to the server, then BBB can receive that high signal in the form of 3.3V. The BBB analyzes this data and decide which operation is to be performed. Suppose at client side user has pressed ON radio button, then high signal is getting on server side with the help of internet. BBB sets the GPIO pins and send it relay circuit.

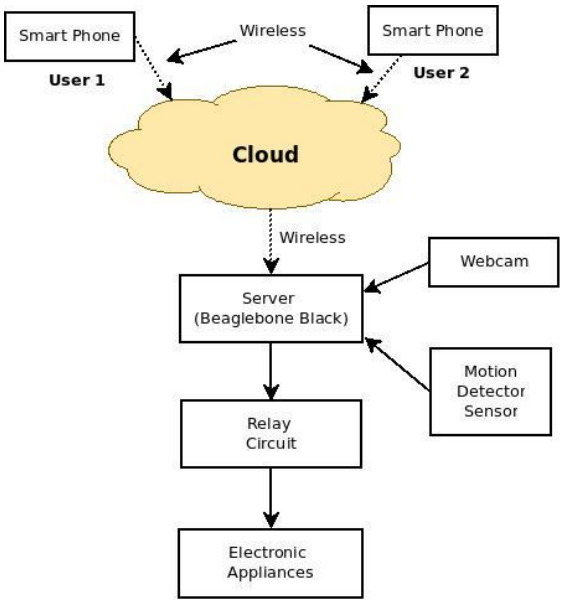

Figure 2. Proposed system.

Relay circuit. It is an electronic component and acts as a switch. The principle of relay is based on right hand thumb rules. According to right hand thumb rule, folded finger indicate the direction of the magnetic field and thumb indicates the direction of current.

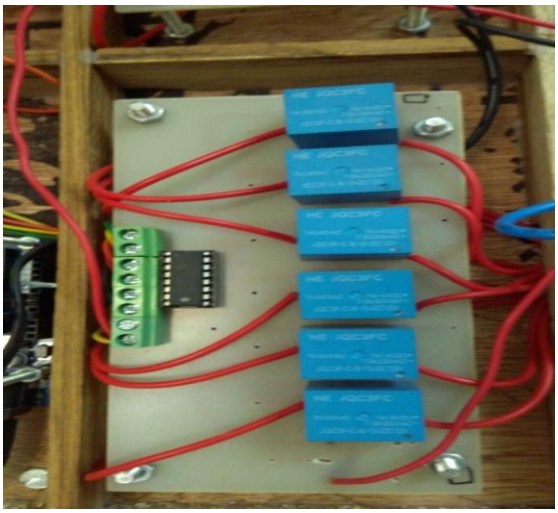

Figure 3. Relay circuit

IV. CONCLUSION AND FUTURE SCOPE

The home automation system is required because a human make mistake which cause shocks due to electricity to avoid this problem we can use proposed system, by mistake we forget to switch off home appliances which cause wastage of electricity these problems can avoid using this system. In this system we have given feature of security system using webcam & motion detector.

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Authors Profile

Mr. Nilesh Gawade have completed Bachelor of Engineering from University of Pune, Pune in 2014 . He is currently pursuing Master of Engineering from Pune University. He has completed two real time project based on embedded system. Currently he is working on smart city project.

Mr.sagar He is working as an Assistant Professor in E&TC department of JSPM, Narhe Technical Campus, Pune. He has completed B. E from DYPIET, Pune and M.E from NMU, Jalgaon. He is having total 8 years of experience in teaching, published two patents and no. of papers in peer reviewed journals and editorial board member in 3 international journals.

