

Smart Home System based on IoT

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Abstract— As we know home automation system uses portable device as user interface, monitoring and controlling home appliances will be the demand of new era .main objective to developed proposed system is to provide remote level control and monitoring by means of few communication protocol like this Wi-Fi, Zigbee. This system uses wireless technology to avoid wired connection between appliances and the gateway. It helps to do complete monitoring and control functionalities of the home environment using wireless sensors and actuators modules than just the switching ON/OFF functionality provided by similar systems. Multiple appliances can be control and monitor using IoT in propose system web portal will play an interface between appliances and android app to be develop. Raspberry pi which will control devices and sensors in propose system, relay controller will be used to automate the home appliances. If the web affiliation is down or the server isn't up, the embedded system board still will manage and operate the appliances domestically. By this we provide a climbable and price effective Home Automation system.

Keywords---Android, Raspberry pi, sensors, Wi-Fi, web portal.

I. INTRODUCTION

In today days electricity is the every one basic need and consumption of energy is increases day by day .and resources energy decrees day by day. Usage of power is also increasing that's why prevention is better than cure awareness of energy consumption should be brought into every place before resources get extinguished. And in now day's technology is the most important part human's life.by using these technology social interaction of peoples growing. Technology are also use for transportation ,internment and in medical field its also usage for creation of many devices like mobile phones ,computers laptops have caused many peoples are connected to technology to communicate with their friends ,family access and store the information such as document movie music and picture. The internet has become a common interface that many devices use to simplify the daily life of many peoples. Internet helps us to take immediate solution for many problems and also able to connect from any of the remote places which contributes to overall cost reduction and energy consumption.

The designed system will help in reducing the energy wastage by continuously monitoring and controlling the electrical appliances.

Smart Home or home automation introduce technology for home atmosphere which is usage to provide ease and protection to its occupants. By using the technology of the Internet of Things, The **internet of things (IoT)** is the network of physical devices, vehicles, buildings and other items embed with electronic, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.[1]

Smart Home automation is the residential extension of building automation and involves the control and automation of lighting, heating, ventilation, air conditioning (HVAC), appliances, and security. Modern systems generally consist of switches and sensors connected to a central hub sometimes called a "gateway" from which the system is controlled with a user interface that is interacted either with a wall-mounted terminal, mobile phone software, tablet computer or a web interface.

Smart Home automation means to connect all electrical devices in the home to a central control system that control those devices according to user inputs. The connected electrical devices are intelligent in a sense. Internet helps us to bring in with immediate solution for many problems and also able to connect from any of the remote places which contributes to overall cost reduction and energy consumption The Internet might even be utilized in home automation that offers several decisions from economical use of energy to additional console, protection and safety. Even over great distances the user can monitor and manage their home gate, various appliances and turn on/off the T.V without any human intervention. [2]

In past home automation, sensors are usage for data collection, transmission of data and then sends to the server and gateway for analysis the information. In existing system relationships in between actuator and sensors was clearly defined.in proposed system IoT environment is uses.in proposed system sensors and actuators are not clearly separated but rather it defined as an individual object or thing, in these each object and things is sensors .

II. LITERATURE SURVEY

First paper we referred for literature survey,

1. **"The internet of things: A survey."** (Atzori, Luigi, Antonio Iera, and Giacomo Morabito) These paper state that Home automation for the older and disabled people .That will offer raised quality of life for persons. It may provide an interface to home appliances or the automation system itself, via telephone line or the internet, to supply management and observance via a smart phone or personal computer.[1]

2. **"Towards the implementation of IoT for environmental condition monitoring in homes."**(Kelly, Sean Dieter Tebje, Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay.) In this paper, we have reported an effective implementation for Internet of Things used for monitoring regular domestic conditions by means of low cost ubiquitous sensing system.[2]

3. **"Security Architecture of the Internet of Things Oriented to Perceptual Layer."** (Zhang, Weizhe, and Baosheng Qu) .The Internet of Things (IoT) is a omnipresent Internet-based network. However, the IoT exhibits characteristics that pose considerable risks: heterogeneity, inherent openness, and terminal vulnerability.[5]

4. **"Raspberry Pi based interactive home automation system through E-mail."**

(Jain, Sarthak, Anant Vaibhav, and Lovely Goyal). In Resent year Popularity of Home automation has been increasing because of low cost and simplicity through tablet and Smart phone connectivity. It is an automation of home or house hold activity. [3]

III. PROPOSED SYSTEM

The block diagram of proposed system is shown in Fig. 3.1. The Infrared sensor (IR) is a low cost infrared object detection unit that we can be applied at home using IR LED's. It gets trigged when light is detected. When the sensor is sensed it sends a signal to raspberry pi. From the raspberry pi, by means of WIFI configuration and IoT concept we can turn ON/OFF the light & Tv. Similar to IR, the PIR sensor is used to detect the human being presence and accordingly the fans are turned ON/OFF. The lights and fans and television can be controlled by creating web server in personal computer, tablet or we can create an app in mobile.

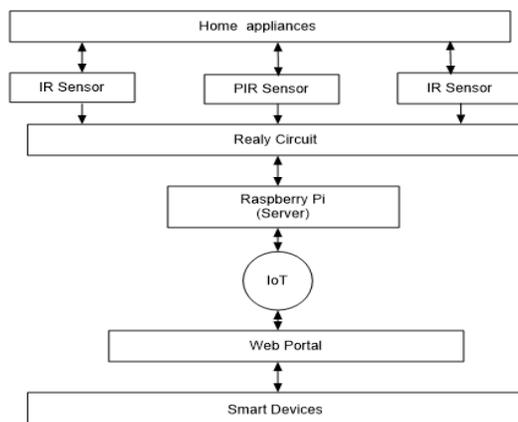


Figure 3.1: System Architecture

3.1 System Design

Modules:

As shown in Figure3.1, describes the modules of our proposed system

Home appliances

In proposed system operate three types of home appliances like as LED light, fan and also Television (TV).That we can operate using smart devices.

Sensor

Sensors are used to continue sensing the home appliances. The IR sensor module is easy for operation.IR sensors detect infrared light, which is used to turn ON/OFF of lights. The PIR sensor is passive infrared sensors. PIR sensor is used to detect the human being presence and accordingly the fans are turned ON/OFF. Sensors sense same data and send to the raspberry pi board which act like a server.

Relay circuit

A relay is an electromagnetic switch which is continually operated by a relatively small electric current that can turn off /on a much larger electric current. relay circuit act as actuators ,in proposed system smart device are send on/off command to the server, after that server send on/off signal to the rely circuit which used to control the home appliances .[4]

Raspberry pi

The Raspberry Pi is a low cost credit card sized single board computer developed by raspberry pi foundation.

Raspberry pi is controlled by a modified version of Debian Linux optimized for the ARM architecture. The heart of the home automation system is this minicomputer. Here in this system we are using model B plus. In proposed system raspberry pi act as web server. [3]

WI-FI Router:

The WI-FI unit provides the medium for communication between home appliances and sensors. It can be also configured to make security services. The WI-FI should be configured with a user commands and certain address will be directing through Wi-Fi unit.

Smart devices

Smart devices like as smart phone, pc (personal computer), tab etc.so using smart devices android app control and monitor home appliances.

IV. ALGORITHM

Try Level Context Making Model: The tri-level context making model plays an important role of generating context from collected data depending on the type and motive of service domains, the motive context making model is service oriented and divided into three levels. The proposed of each level context making model has different service types, which are a simple monitoring service, user-centric service and an automatic control service. Consider following three levels.

Data acquisition

In which data measured from the sensor is collected and calibrated. In proposed system sensor sense data and collect that data.

Information processing

In this step, the information engine provides appropriate threshold values according to collected data and sensor characteristics is processed into information which is low-level context. According to these process .in proposed system sensors sense data and process that data to the server .smart home system raspberry pi act as a server. In proposed system other side smart devices give some input to the server that input process to the server.

Context making

The aim of this step is to generate the situation-aware or context-aware information based on the information engine.

This engine transforms the information into high-level contexts depending on the service type. According to these step finally connection is done between smart devices and home appliances and proper action can be done like as on/off light, fan, TV. [6]

V. CONCLUSION

In this proposed system, a prototype low cost home appliances control and monitoring system based on wireless embedded gateway is proposed and implemented. The home automation using Internet of Things has been experimentally proven to work adequately by connecting simple equipment to it and the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data, like light sensors, but also actuates a process according to the user requirement, for example switching on the light when it gets dark. Any Android based Smart phone can be used to access the home equipment remotely through internet.

Future works can be done on increase this protocol model by including all home equipment and services that provide notifications, energy saving ,automation, telecommunication ,security ,entertainment and computers etc and thus make a more intelligent home automation system. It also stores the sensor parameters in the database (webpage) in a timely manner. This will help the user to observe the condition of various parameters in the home anywhere anytime.

REFERENCES

- [1] Atzori, Luigi, Antonio Iera, and Giacomo Morabito. "The internet of things: A survey." *Computer networks*. (2010).
- [2] Kelly, Sean Dieter Tebje, Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay. "Towards the implementation of IoT for environmental condition monitoring in homes." *Sensors Journal*, IEEE 13.10 (2013).
- [3] Pavithra.D, Ranjith Balakrishnan. "IoT based Monitoring and Control System for Home Automation." *Proceedings of 2015 Global Conference on Communication Technologies (GCCT)* (2015).
- [4] Rajesh K R, C A Bindyashree. "Multiple Appliances Controlling and Monitoring System based on Wireless Embedded Home Gateway." *IJIRCCCE* (2015).
- [5] Zhang, Weizhe, and Baosheng Qu. "Security Architecture of the Internet of Things Oriented to Perceptual." *International Journal on Computer 2* (2013).
- [6] Byeongkwan Kang, Sunghoi Park, Student Member, IEEE, Tacklim Lee, and Sehyun Park. "IoT-based Monitoring System using Tri-level Context Making Model for Smart Home Services." *IEEE(ICCE)* (2015).