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A Review on Cloud Based Automation System

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ABSTRACT: In recent year's number of network enabled digital devices are present at homes. With the fast increase of the internet the owners have been requesting remote controlling on in-home devices. This android based home automation system allows multiple users to control the application using android application or web site. The system has 3 component those are mobile device to control the home appliances from any location , second is server placed on the cloud which stores data related to appliances and user and third device is wifi router placed at home which actually controls appliances by sending notification to micro controller.

KEYWORDS: wifi device, cloud, android device, web server, GCM (Google Cloud Messenger)

I. INTRODUCTION

The automation is the introduction of technology for any infrastructure to enhance operating of the devices placed in that infrastructure. Recently the automation becomes a popular field of research by the introduction of different technologies like remote control systems, network enabled devices and internet technologies. Automation aims the orchestration of digital devices to provide user real comfort with security and ability to monitor multiple devices from any location and at any time. Traditional automation systems involve the controlling of digital devices those provide the functions such as heating, lighting and shading.

The benefits of automation systems are listed as safety, comfort, saving of power and better communication. As the systems provide these benefits, some technical requirements also required like low cost, plug and play, flexibility, easiness of use and reliability. The system is designed to serve multiple users, using emerging technologies like GCM (Google Cloud Messaging) to support the communication between the main hardware components of the system and mobile device.

II. RELATED WORK

There have been significant systems and numerous approaches for the home automation systems. There are several existing automation systems like:

1. Bluetooth based home automation system:

This system involves a primary controller and a group of Bluetooth sub-controllers in which each controller is physically attached to a separate home devices. The sub-controllers are responsible to transfer all messages to primary controller. Although the system decreases physical wiring by using the Bluetooth technology this technology has the disadvantage of an access delay because of the sharing of a single Bluetooth module between numerous devices.

2. Java based automation system:

In this system embedded board which is composed into a personal computer based web server is physically attached to all home devices. Java technology used in the system gives a built in security. However, the use of a high end computer and the wired connections per home increases the cost of the system.

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3. Phone Based System:

An interesting system, phone based remote control system, is proposed in. Unlike the numerous systems using the internet, the communication in the system is all performed over a fixed telephone line. The advantage of the system is that it can be accessed via any telephone. On the other hand, the lack of graphical user interface, the necessity to remember the user access code and the device codes can be listed as the disadvantages.

III. PROPOSED METHODOLOGY AND DISCUSSION

Main components of the proposed system are pointed out with diagrams showing the communication infrastructures where those parts are in-use which are as shown below.

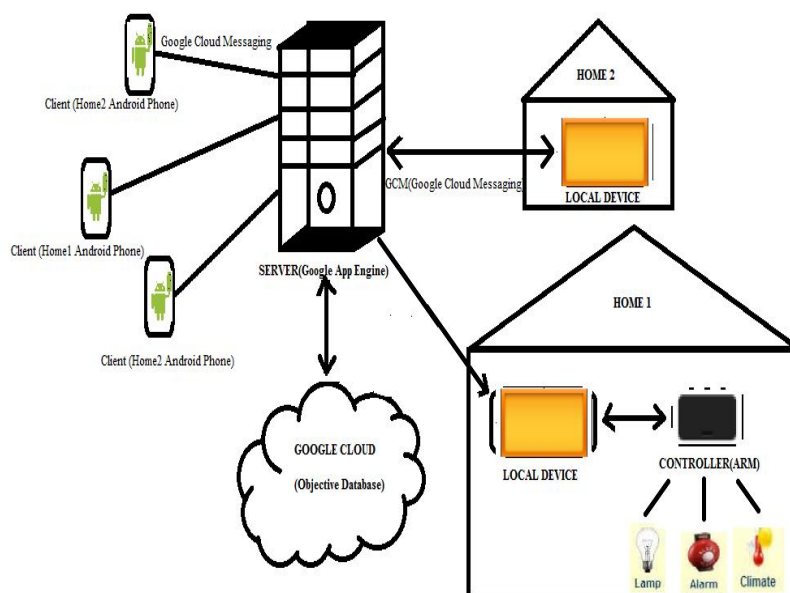


Fig. Communication Infrastructure of Proposed System

The system involves the following three components: local hardware, web server, and mobile smart device.

1. Local Hardware:

The local hardware includes the wifi device and the network devices connected to household appliances. After setting up the local hardware and equipments at home, the owner of the proposed home automation system enters the home id given by the administrator of the system and password on to the login page of the application in local device. On the GCM server side, one-time registration is also necessary. A registration id is requested from GCM server and this id is recorded to the session manager of the application in local device. the web server component will recognize the local device with that id.

2. Web Server:

The web server keeps the user records and serves to the other devices in the system. The web server computer offers Google Cloud Messaging (GCM) service to connect the system with the local devices and the mobile devices. GCM (Google Cloud Messaging) is used for supporting the two direction communication between local device and web server and also mobile device and web server. The GCM service handles queuing of messages and delivery to the target mobile device. The web server also provides a web site for the users of the system (the customers and the administrators) to deal with the records stored in the database of the system.



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3. Mobile Device:

The last component is the mobile smart device running Android operating system like smart phones or tablets, on which the Android application of the system is installed to make the mobile customers contact with and manage the in home devices via the server. The mobile device application simply receives the message from the user, stores the message in the session manager of the application and transfers data to the web server using HTTP method.

Modules:

1. Local Hardware Configuration
2. ARM Controller Configuration
3. Web Server Configuration with GCM service.
4. Android Mobile App for use
5. Web Application Interface.

Mathematical model:

Set of Input = {U, S, D,G}

Set of Output= {Msg}

Server = {IP, MAC}

Where

G is a GCM (Google Cloud Messaging Services)

Msg is response message

U is a set of users

$u_1, u_2, u_3, \dots, u_n \in U$

There can be number of users in our system which interacts with our developed system and uses features of our system.

S is the Web Server

D is set of Devices

$d_1, d_2, \dots, d_n \in D$

IP is an IP address of Server (S)

MAC is MAC address of Server (S)

IV. CONCLUSION

The paper proposes a smart automation system using Google Cloud Messaging server and Android operating system as the upcoming technologies used in automation area. The system has three hardware components: a local device to send signals to home appliances, a web server to store customer data and provide services to the other components, and a mobile device running Android application.

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