Android Supported Smart Home Automation for Indoor and Outdoor Environments

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ABSTRACT
The goal is to develop a system which can control the electrical appliance through an android mobile phones. For this, in this systeminterfaced analog electric board with digital circuitry which is completely controlled by the static server at end of a specific area. Task like controlling all devices and history checking is provided. Low expensive micro-controller is usedto control all system. The current status will be transmitted relentlessly to the local server along with the meter number. This data will be processed by the static server and generates the result automatically. The user will be able to view current status of all devices and modify it.

Keywords
Internet of Things, Wi-Fi Connectivity, Android Based Smart Phone, Sensors, ARDUINO Micro-controller

1. INTRODUCTION
Smart home automation systems involve the control of digital devices whichimpart functions such as heating, lighting, motions and shading. Due to fast growth of information technology and modern entertainment systems in last some years, these basic functions are required to be enhanced with additional resources (i.e. Music system volume reduction when the telephonerings. The benefits of home automation systems (the smart house systems) are listed as safety, comfort, power saving, less wired installation, no need to install separate server per home and communications. To provide these profits, some technical requirements must be also considered, such as low cost, plug and play, flexibility, ease of use and reliability. The requirements are analyzedas described: - The wireless home automation systems should be easy to extend to simplify the unification of new devices.-The system should supply user-friendly graphical interface on the owner side, so that the devices can be easily configured, supervisedand controlled. The system interface should alsoaid some diagnostics services to track normal problems. Automation lowers the human discriminationsthat costs lowest degree possible but does not completely reduce it. Depending on the locality of its usage, automation differs in its name as industrialized automation, home automation etc. With the augmentationof low cost electronic components home automation migrated from being a manufacturing application to home automation. The home automation, this systemstudy concernswith the control of home appliancesfrom a centralized location. Market researchesprofess that most of the homes will be equipped with home automation systems in the very near future.

2. RELATED WORK
Smart home automation system is the introduction of technology within home to enrich the quality of lifestyle of its occupier, through the equipping of different services, such as Multimedia entertainment and energy saving. In other words, home automationaims at the composition of digital devices for the convenience of users together with security and the capability to monitor multiple dwellings. Traditional home automation systems involve the control of digital devices which provide functions such as heating, lighting, motions and shading. The Existing System controls the devices using Embedded Electronics and also make decision support using rule based system customization usingandroid application which not select proper quantity of context samples .Therefore, The Goal is to develop a system which can control the electrical applicationsthrough a smart mobile phones. For this, proposed system interfaced analog electric board with digital circuitry which is completely controlled by the static server at end of a specific area. Task like controlling and history checking is provided. Low expensive micro controller issued to control whole system. The current status will be transmitted relentlessly to the local server. This data will be transferred by the server and creates the result automatically. By using of relevant algorithm the user will be able to check current status and modify it.This system presents an application which can control the electrical signals through a smart mobile phones. In this methodology interfaced analog electric board along with digital circuits which all are completely handled by the static server at end of a particular area. Twomain task like controlling and checking of history is done. Low expensive micro controller is used to control all over system. The current system status will be transmitted through wireless to the static server along with the meter number. This data will be processed by the server and generates the result automatically. The user will be able to view current status and modify it. The user should provide authentication by providing username and password to the application. Also in this system Encryption-Decryption algorithmic used to avoid hacking of application through other schemes. Temperaturesensor controls the room temperature. Motion sensor detects the motion and take appropriate action.

3. LITERATURE SURVEY
[1] Sriskanthan N, Tan F and Karande A. Bluetooth based home automation system. In, the Bluetooth based home automation system is presented. The system contains a primary controller and a set of Bluetooth sub-controllers in which each controller is physically joined to an independent home device. The sub-controllers are accountable for disseminating all messages to the primary controller. Although the system decreases physical wiring through the

use of Bluetooth technology, it has the disadvantage of acquiring an access delay due to the sharing of a single Bluetooth module between numerous devices.

[2] Al-Ali AR, Al-Rousan M. Java-based home automation system. In a Java based home automation system, an embedded board integrated into server is actually connected to all home devices. Java technology used in the system provides built-in security. However, the use of a high end computer and the wired installation per home growths the expense of the system.

[3] Gill K, Yang SH, Yao F, Lu X. A ZigBee-based home automation system. The discussion of the potential of ZigBee standards in home automation systems, a particular home automation system based on ZigBee and Wi-Fi network is presented and a virtual home is created. It is reported in the study that ZigBee technology has advantages, such as lowering the expense of the system and insensitivity of the respective system installation matched to existing technologies.

[4] Golzar MG, Tajozzakerin HR a new intelligent remote control systemfor home automation system aims to reduce energy consumption, and is based on an embedded controller connected to the home web-server and the sensors/actuators at home. The users command home devices through the website on the home web server. The user and control data are stored at home. Similar to the system in **[2] Al-Ali AR, Al-Rousan M. Java-based home automation system,** the need to install a separate server per each home may be considered as a disadvantage of the system regarding the expense.

[5] Ardam H, Coskun I. A remote controller for home and office appliances by telephone. Unlike the several systems using the Internet, communications all performed over a fixed telephone line. The advantage is that it can be retrieved via any telephone. However disadvantages include the lack of graphical user interface, the need to reminisce the user access code and the device codes. Due to the limited resources and difficulties of expanding the scope of home automation applications, the cloud organization is becoming extremely appropriate for home automation by enabling on demand access to shared pool of configurable computing devices and storages. Manyresearchers have carried out studies focusing on the use of cloud computing in home automation to process and analyze the huge amounts of data generated by sensors deployed throughout smart homes.

4. PROPOSED SYSTEM

The Existing System controls the home appliances using Embedded Electronics and also make decision support using rule based system customization using android application which not select proper quantity of context samples .Therefore, Theaim is to develop a system which can control the electrical appliance through a mobile handset. For this we interfaced analog electric board with digital circuitry which is

Completely controlled by the server at end of a specific area. Task like controlling and history checking is provided. Low cost microcontroller is used to control whole system. The current status will be transmitted wirelessly to the local server along with the meter number. This data will be processed by the server and generates the result automatically. The user will be able to view current status and modify it using relevant algorithm.

4.1 Proposed System Algorithm

Algorithm: Semantic Distance-based Rule Matching Algorithm

Inputs of the algorithm: *Context* – current context; *Rule* – rule set for context-aware adaptation; *Reduction* – result of attribute reduction; *Weight* – weight of context attributes.

Outputs: *Matching rule* – the matching rule.

Step1. Initiate minimum distance minidisc=1, i=0, j=0, dist=0, and rule ID= min_ruleid;

Step2. if (i==Rule length ()) Go to Step5; else Calculate Rule[i] in Step 3;

Step3. //Calculate each attributes in reduction i - Reductioni[j]; if (Reductioni[j] is numeric)
*dist+=Weight[j]*abs (Context[j], Rule[i].get Value (Reduction[j].id))/Rule[i].getRange (Reductioni[j].id) ;*
Elseif (Reductioni[j] is non-numeric)
dist+=Weight[j](1-GCSM (Context[j], Rule[i].getValue(Reduction[j].id)));*
if(j==Reductioni.length()) Go to Step4;
else j++;

Step4. if(dist<min_dist) { min_dist=dist; min_ruleid=i; dist=0; Go to Step2;} else { i++; Go to Step3; }

Step5. The minimum distance is min_dist and the matching rule Matching_rule=Rule[min_ruleid].

4.2 Goals and Objectives

The main objective of this project entitled Automation of Electricity Managements to generate information appliance to the user with advancement of mobile device support. Another objective is to develop application which can automatically control temperature in the room. Develop a system which can detect motion and automatically take appropriate action.

4.3 Architecture

4.3.1 Web Server

Web Server stores customer records, and Serves the other components in the system. It manages the communication between the device and mobile smart device, and the communication across device and web site. It is used to aid the two way communication among home device and webserver, and also between the mobile device and web server.

4.3.2 Android Supported Smart Mobiles

Android Supported Smart Mobiles does the working of sending request to web server for changing /checking current status of the device.

4.3.3 Hardware

Hardware consists of ARDUINOwhich provides the connectivity to devices in the home. And also provide connectivity to different sensors established in the homes Motion Sensor, LPG gas Sensor, Temperature Sensor etc. Throughwhich devices are controlled.

4.3.4 LPG Gas Sensor

They are used in gas leakage sensing equipment's in family and industry, are suitable for detecting of LPG, ISO-butane, propane, LNG, escape the noise of alcohol and cooking gases and cigarette smoke.

4.3.5 Motion Sensor

The PIR sensor itself has two slots in it, each slot is made of a special solid that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' outpost some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves. When the earnest body leaves the sensing area, the inverse happens, whereby the sensor generates negative differential change. These change pulses are what is detected.

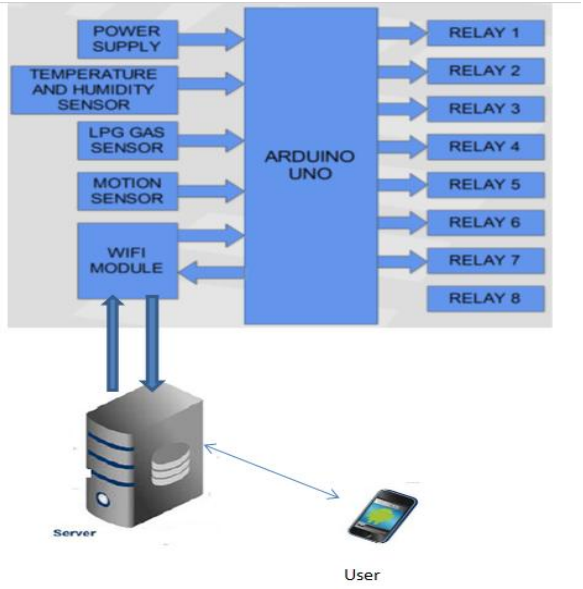

Fig1.Proposed System Architecture

4.4 Working

User consists of Android supported smart phone, which needs to login to the web server .Then Web server checks authentication by checking the Username and Password. User Sends request to web server for checking and updating status of home appliances. Then server checks the status of home appliances with the help of ARDUINO which connects to the Wi-Fi module for providing connection to the ARDUINO. ARDUINO has connectivity to the MQ6 Gas Sensor, PIR Motion Sensor, DHT11 Temperature and Humidity Sensor, which does their working as described in (3.2.3).ARDUINO checks the status of home appliances via digital communication when user sends a query for checking status of appliance and output is 1, then status of device is ON, if output is 0, then status of device is OFF. Via digital communication ARDUINO checks status of particular device and does appropriate action. For example, Suppose, User wants to OFF the fan via android supported smart phone, then it first sends a request to the web server .Web server has a connection with ARDUINO through Wi-Module. ARDUINO checks the exiting status of fan through digital communication if ARDUINO gets output 0, means fan is OFF, no need to take any action. But if ARDUINO gets status of fan ON then user needs to change it with the help of web server and ARDUINO.ARDUINO connected to the electronic appliances with the help of relays. Through which it's easy to check and update status of electronic device. With the help of sensors particular condition observed and change the device status accordingly. For example, when there is gas leakage then it buzzes an alarm and then particular action to prevent gas leakage is taken. With the help of temperature sensor room temperature is maintained. If temperature goes high, then it gives Pop-Up Notification on Android based smart phone and then appropriate action will be taken through smartphone.

5. EXPECTED RESULTS

System should work properly based on semantic distance based algorithm for home automation and controls the home appliances according to given instructions through android device .according to digital communication system should work properly like ON or OFF home appliances.

6. CONCLUSION

This Paper, presented the Study of various home automation System. This application is pretty much useful to the user in various features. The user got theabilities for various tasks to perform from single application in hand. It enables user to perform history checking, observing current usage and also the appliances can be controlled via signal of activity. Thus system can determine that the usability and performance of application can be a great use for anyone who accessesthis application. Implementation of successful system lowers human work by simply operating home appliances through android based smart phone. System gives all importance updates of electronic appliances through pop-up notification on smart phone through which we can easily operate devices offline in future with very low cost microcontroller. i.e. ARDUINO microcontroller.

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