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Electrical Utilizationswell-Ordered by Smartphone Using Smart Huis Through Android Studio Optimization

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Abstract: The rising popularity of home automation is mainly due to its lower costs, readilyavailable and easy usage through smartphones. The greatestproblem in developing a home automation control system is building anall-time reliable control system with all the required features under a single system. The aim of Smart Huis (Huis-Home in Dutch) project is to build a home automation control using android smartphone with high security features like face lock, audio control, surveillance and access controls. The design not only focuses on providing safety features but it also gives features like mathematical data about the electrical appliances, using of system from anywhere around the world, timely control and a distributed framework of home control. More of itsinteresting features areit is more compatible with users who are differently abled. Adding to its features an improvised level of life with minimizedelectricity consumption costs saving of energy is duly done.

Key words: Home Automation android Smart Mobile・etc.

INTRODUCTION

With the recent busy buzzing days people often tend to forget to switch off their home appliances while leaving their home. In such situations people have to go back to their home to switch off their appliances and return back to their busy works or in other situation it could cause accidents like short circuit, firing etc. This would automatically involve wastage of time and cause lots of chaos and tension around. To avoid all such chaos the latest trend which the world is moving towards is automation [1, 2]. Smart Huis is a home automation control system using android mobile in which one could make use of his/her android smart phone to control switching on/off the electrical appliances in his/her home from anywhere around the globe in a highly secured manner. SmartHuis is useful for people of all ages and can also be used in their day to day daily activities. This section of SmartHuis describes on how about a home can be controlled using the Android Smart Phone. It consists of three important parts of control. The first being the Android Smart Phone which communicates with the Web Server to make it in turn communicates with the central device and other peripherals.

Review of Literature: In these fast moving years there are many research studies and deployments which are going on to make automation possible not only at homes but also in industries trying to make automation smarter and smarter day by day. But the problem with all such systems is that there seems to be no single stable system under which users could be provided with all the essential features under it. Regarding the security [3] issues anyone can access the system without any authentication required for users which also is said to be one of the main concerns to worry about. More than this all of the already so built systems lacks the capability of extending their functionality on a much increased range once after the device is first installed, which means that the users have to reconsider the electrical supplies if they wish to extend the usability range of their automation control after the very first installation.

New Approach: With the introduction of SmartHuis into the household appliances people would be able to restrict their access from a device on the number and type of appliances that a user could control in his/her home and also extends by providing face recognition lock. In addition users would also be able to extract statistical data

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of the electrical consumption on each and every appliance in their home. It provides the option of either to control the appliance using Bluetooth connection or by making use of Local Area Network (LAN)/Wi-Fi thus allowing a global wide access. Live Streaming and monitoring [4] of our homes is also possible through SmartHuis. For people who are differently abled voice control is one more an added option. Scheduled control is an added attraction. Above all these when needed to extend the control of number of appliances to an increased number after the very first installation is also made easy through SmartHuis.

MATERIALS AND METOHDS

Through Android Studio optimization of the SmartHuis Android Application has been done to establish the RFCOMM (Radio Frequency Communication) for the Bluetooth Communication and for the TCP/IP (Tramission Control Protocol/Internet Protocol) sockets for Internet Connection [5]. A 240V supply from the main will activate the Arduino Controller and is also regulated to obtain an operating voltage of 5V. Bluetooth of class 1 module which covers a range of 300ft is fitted in the Arduino Controller and the 8-channel relays which concentrates on the switching on/off of the electrical appliances [6, 7], With this an Arduino LAN Shield and Wi-fi module is also connected to establish a smooth communication between the Android Smart Phones and the Arduino Controller through the Internet Connection. The switches are also smart so that they can either be switched automatically or either manually also. Arduino sketches are developed using the Arduino IDE which is basically C programmed.

Hardware Implementation and Working: Fig. 1 shows the hardware implementation Architecture of SmartHuis. The major sections of SmartHuis include Android Smart Phone, Web Server and the Arduino Controller. When SmartHuis is installed in a home user's device Id is registered along with its IP address and email address of the user in SmartHuis database. User will also be provided with a username and password to login into his/her account of SmartHuis as shown in Fig. 2.

This user will be granted the access to all the appliances or switches that he/she could control in his/her home. By logging into his/her account he/she could add more users into his/her device by registering mail id's and allocate only limited switches that user can control or monitor. Then the user can download the SmartHuis Android Application into his Android Smart Phone. During the very first sign-in it asks the username and password of the user which was given at the very first step [8]. The users it so that the device id is fetched from the database and locally stored in the mobile along with the switches which could be controlled. Now after signing in the user could see the list of switches which could be controlled along with the option to choose whether the communication can happen through Bluetooth or through the Local Area Network (LAN)/Wi-fi as shown in Fig. 3.

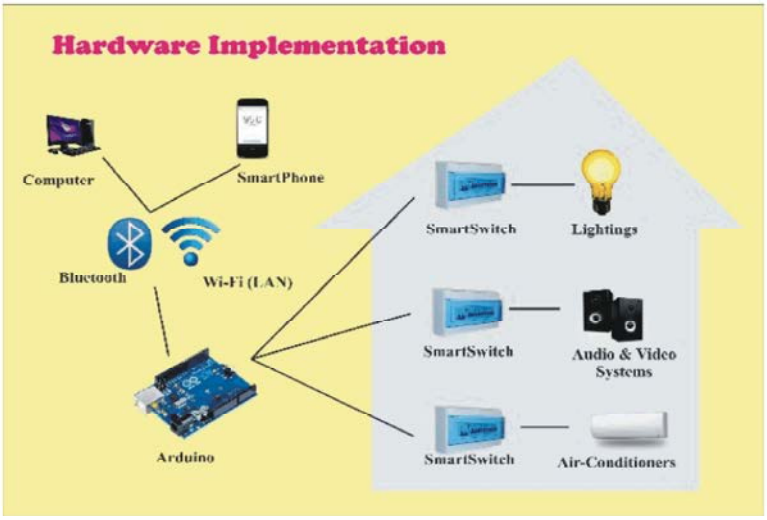

Fig. 1: Hardware architecture of SmartHuis.

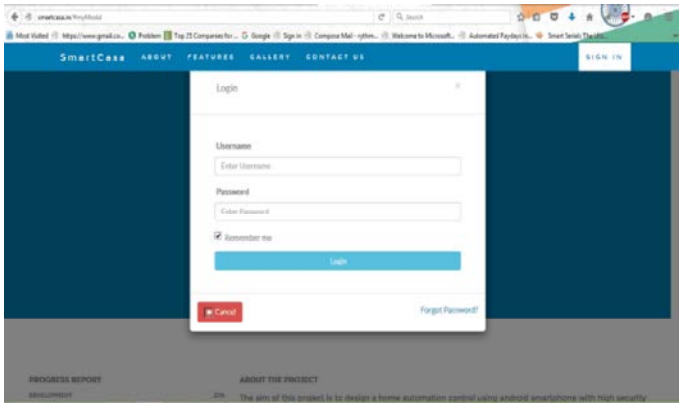

Fig. 2: Login activity into the Web Server

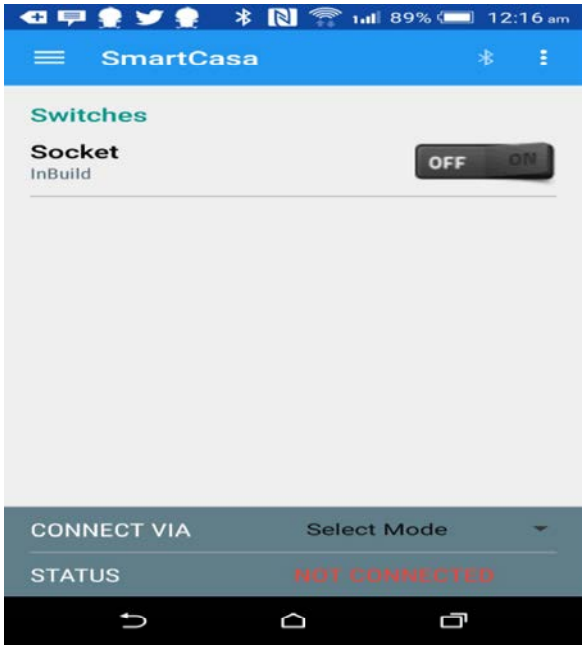

Fig. 3: SmartHuis Android Home Actvity

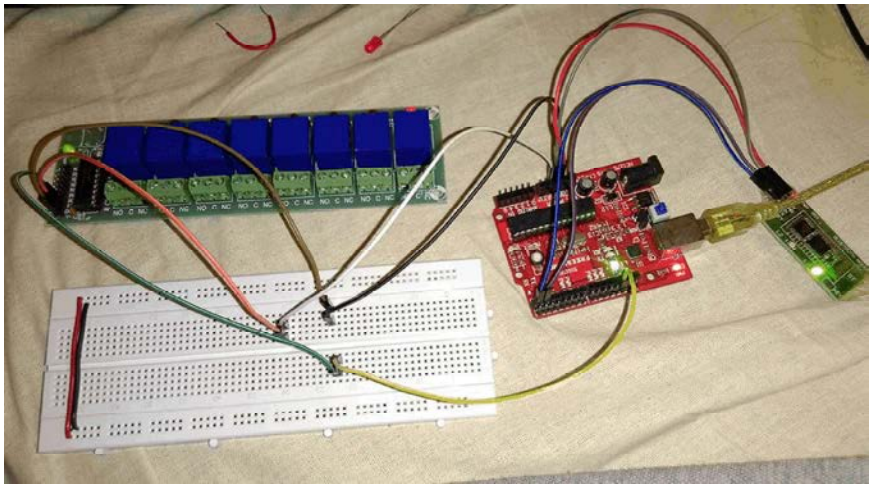

Fig. 4: Hardware Implementation of Model Project

If the user chooses the Bluetooth Connection Mode it searches the locally stored device id to connect through the Bluetooth and if it finds the status will be updated as connected and as Bluetooth socket connection will be established between the Android Smart Phone and the Central Arduino Device fitted in the home. If the connection is through the Internet then the Android Smart Phone makes use of its locally stored IP address and sends the message to the mentioned IP address [9] Now the IP address is the Arduino IP address and therefore it interprets the message and acts accordingly to it. Now when the user switches on a switch the Android Smart Phone sends out a message either through the Bluetooth Socket or to the desired IP Address. This message is received by the Arduino Controller as shown in Fig. 4. The Arduino Controller then interprets the message either through the established Bluetooth Socket between the Arduino Controller and the Android Smart Phone or through the request received from its IP address. After interpreting the message and decided on which to control the Controller's Bluetooth Module now begins to act as a Master Module in the home and the Smart Switches installed in the house with their respective Bluetooth Modules begins to act as a slave. So the master orders the slave to either switch on/off accordingly. These switches can be controlled manually as well so that the slaves communicate back to the master about the status of the switch being on/off.

CONCLUSIONS

Keeping in mind the aim of SmartHuis to develop a stable and a single system under which all the necessary and essential features can be applied the product doesn't stop with only the above mentioned works but we have also planned to proceed the works with future enhancements like integration of the sensors like temperature indicator, water tanks full/empty sensors and other indications through the Android Smart Phones. Much more to the liking of the works of Smart Watches in the future addition to SmartHuis will assure that it will all make life easier and better living of high standards.

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