MULTIRESIDENTIAL AUTOMATIC SWITCHING SYSTEM

PROJECT REPORT

Submitted for PBL in B. Tech Technical
Answer for Real World Problem (EEE3999)

By

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Slot: TC1

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CERTIFICATE

This is to certify that the Project work entitled" Multiresidential automatic switching system" That is being submitted by

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for PBL in B. Tech Techinal Answer for real world problem (EEE3999) is a record of bonafide work done under my supervision. The contents of this Project work have not been submitted for any other PBL course.

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I SHANTANU SONI on behalf of my Group members would like acknowledge our faculty **SUMATHI V** for her collaboration and cooperation on our project topic *"Multiresidential automatic switching system"*. We are grateful to her for her guidance and motivation on account of which we were able to complete our project on time.

We would also like to acknowledge the VIT University Management/School Dean for giving us the opportunity to carry out our studies at VIT.

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ABSTRACT

The main objective of the invention is to provide a secure and low power loss system to save energy and electricity bills in multi residential buildings .This helps the authorities of multi residential buildings to have a better organised system with minimum power wastage and more control over all their appliances that are used by the users as and when required .This work is based on GPS location update by the main authority personnel along with user ID, this system helps to give a more easy control of the appliance . Two mobile applications are designed one is for the multi residential building authority personnel mobile application to update the user ID and appliance, GPS location and the other is the user application that allows to login, turn ON and turn OFF the appliances. The app used by the user updates the user's location to the server at specified interval of time, the server helps to keep a check of the status of appliances. As the location of the user goes out of the radius of the appliance GPS location the appliance automatically turns off thus resulting in reduced energy consumption. The user can directly control the appliance until and unless he is in the vicinity of the appliance coordinates, there is a reduction in manual effort and also the exploitation of appliances by third-party users as the control is uniquely based on the user ID. The data base gets updated whenever a new registration takes place. The status of the appliances can be monitored through database and this gives more transparency to the scale in which power is being shared. Thus a smart switching system was developed to help reduce power consumption and to provide a more transparent and controlled system for the multi residential authorities.

In the project for multiresidential automatic switching system, we will look after:

- Most of the times in multi residential buildings the electrical appliances stay "On" even in the absence of people once turned on and left unattended. This causes a lot of unnecessary power consumption and wastage of money

INTRODUCTION

To curb the problem faced we have devised a GPS based appliance control system, which work with the help of a database , a mobile app , common server

When ever students leave there hostel room most often they left the electrical appliance in on state , mainly fans which leads to increase in the per unit electricity price. Even non stopping working of fans leads to early maintenance which further increases the cost.

In this GPS based automation system the GPS coordinates of the user mobile is update onto the server so when ever the user leaves the room , Raspberry Pi will switch on the electrical appliance on bases of coordinates updated onto the server.

BLOCK DIAGRAM

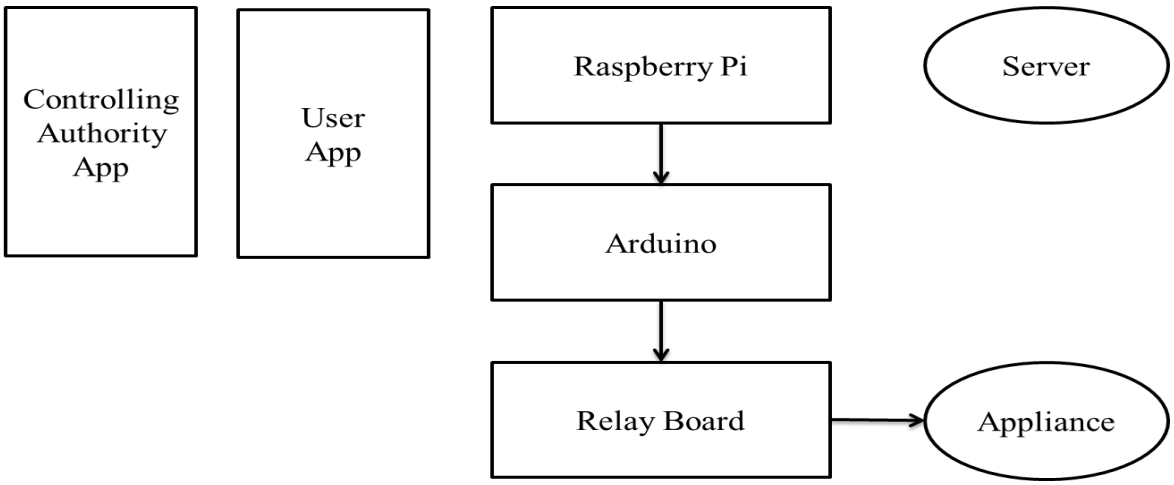


Figure 1: shows the block diagram of the system.

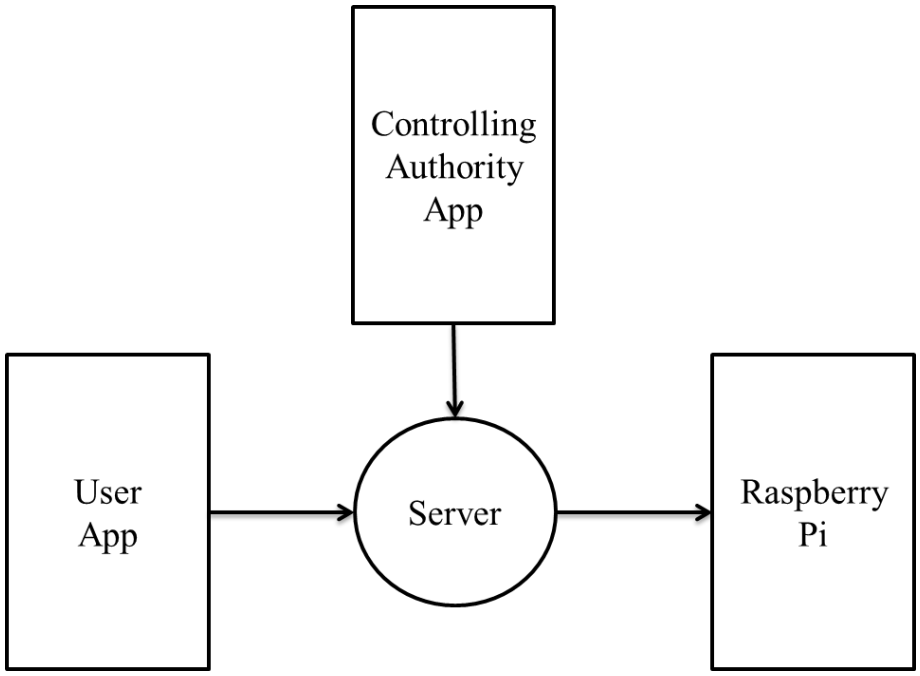
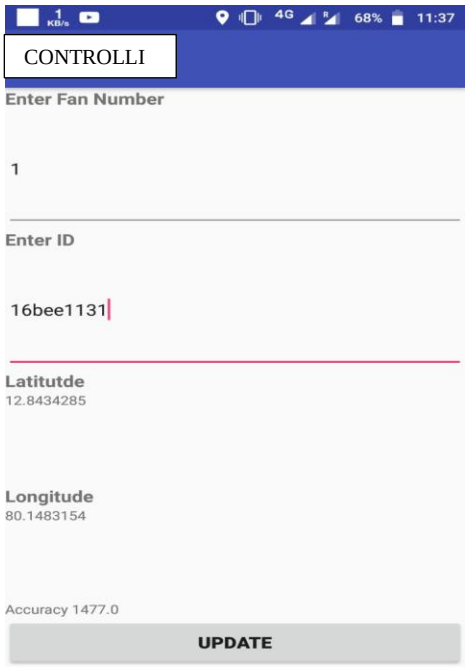
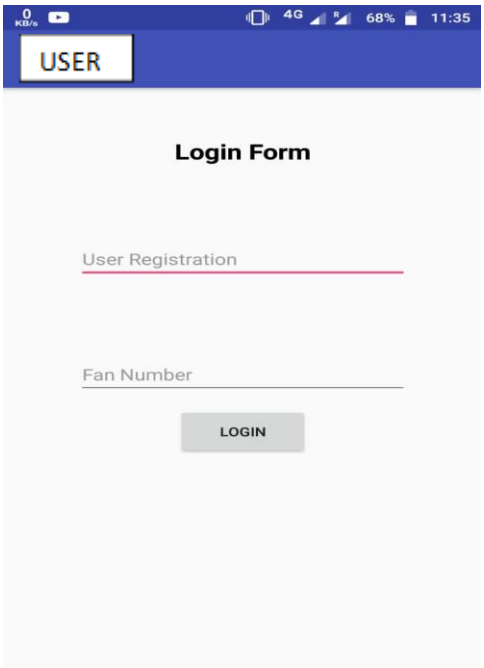


Figure 2: shows the control flow of system.

Figure 3



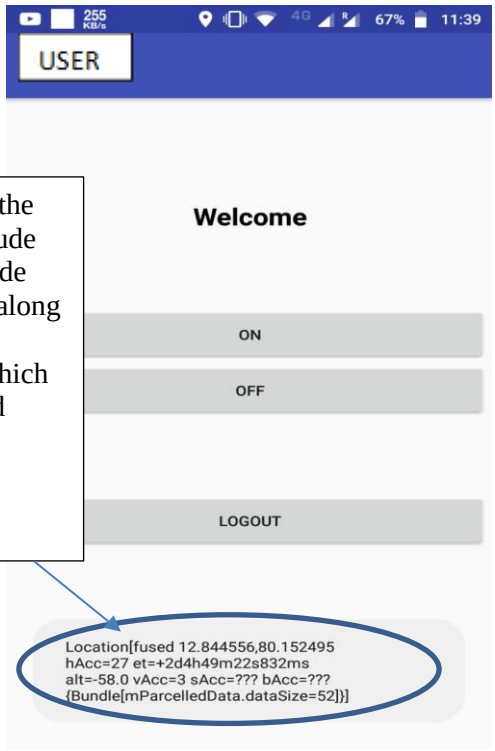
a) Show controlling authority app.



b) Shows user app

c) Shows the block diagram of the system.

This shows the current latitude And longitude Of the user along with the accuracy, which gets updated every 10 seconds.



d) Shows continuous coordinates updating.

Showing rows 0 - 1 (2 total, Query took 0.0056 seconds.)

```
SELECT * FROM `location`
```

Profiling [Edit inlin

Show all | Number of rows: 25 Filter rows: Search this table

+ Options

fan	cous_lati	cous_longi	regno	stu_lati	stu_longi	manual	status	cous_acc	stu_acc
1	12.8434285	80.1483154	16bee1131	12.8445672	80.1524851	1	1	1477	25.166
2	12.8437289	80.1496617	16bee1009	12.8445787	80.1525029	0	1	1400	24.285

Show all | Number of rows: 25 Filter rows: Search this table

Query results operations

Print Copy to clipboard Export Display chart Create view

e) Shows the database.

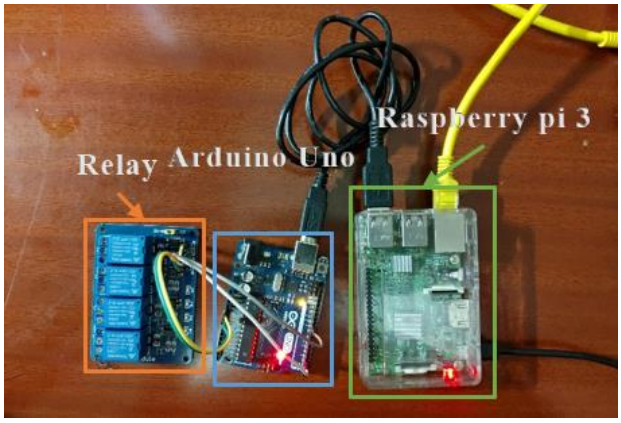


Figure 4: shows the photographic view of model.

WORKING

The overall working model as a block diagram is shown in figure 1 .The block diagram consists of controlling authority app, user app, raspberry pi, the server block, the relay board and the appliance. Controlling authority app figure 3 (a) updates the location of the appliance, fan number or appliance number and also the user ID connected to it into database figure 3 (e) after pressing the update button. The user app figure 3 (b) first page is the login which takes user's ID and also the appliance code after pressing login button it checks the credentials with the database figure 3 (e) and logs in the user. The second page figure 3 (c) is the appliances control page of user app where the user can turn it ON or OFF the appliance. After pressing ON button the app continuously updates the user's current location into database figure 3 (d) after every 10 seconds .Server matches current location of user with the appliance location there is a fault level 5% so that appliance stays ON this is useful in conditions when the user has to go out of the area for some reason that is not much far off from the appliance location, this reduces the need for frequent turn ON and turn OFF of the appliance. The block diagram figure 3 (e) shows the server taking data from the user app and the controller app update it into database and on the basis of locations it gives the command to raspberry pi and raspberry pi give command to Arduino , Arduino further give command to relay board which turns on or off the appliance. The figure 3 (e) shows the data base having a record of user location, appliance location, user's id and the appliance number. From the figure 1 shows that the raspberry pi processes data from the database and sends it to the arduino which in turn turns on or off the specified appliance using relay board. The figure 4 gives the overall view of the hardware and raspberry pi, arduino and relay board connections in the photo.

So overall all these appliances are interfaced together to achieve the required circuit.

COMPONENTS REQUIRED

I. BREADBOARD - Rs.100(Approx.)

II. CONNECTING WIRES

III. RASPBERRY PI

IV. RELAY MODULE

V. ARDUINO(OV7670)

APPROX. OVERALL COST : Rs.5000

COMPONENTS AND WORKING

- Student App
  - This app has to be installed on student's mobile so that his GPS location can be updated on the server And through this app he can control the appliance by mobile

- Customer App
  - Through this app the coordinates of the appliances can be updated on the server during this system installation .

- Raspberry Pi
  - Raspberry Pi controls the appliances on the bases of commands given by the user , GPS coordinates and availability of internet to users mobile and Pi.

ADVANTAGES

- Reduce Per Unit Charge
  - As electricity consumed decrease by each student thus leads to decrease in overall electricity consumption
- Reduce Maintenance
  - As fans and Ac won't always remain in switched on mode they will not lead to

early wear and tear.

- Automated Room
    - Inside a room all the appliances can be controlled by mobile.

DEMERITS

- Decreases mobile battery life
    - More optimised app need to be made which decreases battery consumption
- Manual Operation
    - If any one users mobile or server is down i.e. no internet , Appliance has to be controlled manually through switch
- Need Smartphone
    - Students need to have smart phone in working condition with gps.

OPPORTUNITIES

- Market expansion
    - As electrical automation market is expanding day by day by introducing this unique product a place in market can be made
- Monopoly
    - As this is the unique product in the market we do not need to fight for monopoly .
- Customer need
    - This product is able to fulfil the customer need

THREATS

- Accuracy of GPS
    - As GPS coordinates provide by mobile has an error up to 2km some times.
- Funding
    - Initial manufacturing and launch and R&D need some funding to make product commercial.
- Internet
    - This product work well only when hole campus or hostel have internet

CONCLUSION

There have been many advancement in automation but still advancement in automatic automation is required . By using our product we can save electricity and money . Finally our product is able to turn on and of the appliance based on g.p.s coordinates of the user. And thus we are able to save Electricity.