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An approach for Classroom Automation by Classroom Automation System

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ABSTRACT

A classroom mostly consists of a fan and a tube light at least. Many a times it is observed that it's the human nature and we tend to forget to switch off the lights when we leave the house. This leads to more of energy consumption and wastage of energy. The same scenario can also happen with the classroom. The application of Internet of Things in the modern world is the centre of interest of many researchers and standardization bodies since several years. Thus, in order to achieve the dream of automation, we are giving a special attention to the treatment of classroom automations. Our project will certainly contribute to the concept of classroom automation is some way Hence it is considered as one of the most important issue that needs to be addressed. This system will help to automate classroom electronics such as tube light, fan etc. The time table of classroom is stored in a database. This Database is connected through phpMyAdmin to coding for classroom electricity automation .The coding language used here is Python. Apart from this, for any extra time slot when the electricity in classroom is needed, there is an interface for providing electricity(e.g. For an extra class) and vice-versa if electricity needs to be switched off in case of a suspended class. Teachers can log in the interface so that electricity can be provided when necessary. From this project we can conclude that by implementing this the lights and fans will switch off and on as per the requirement, and automation will save electricity. If electricity is needed during a particular time slot is also possible. This is a project that will help in automation and saving of the electricity. This model has been proposed to meet the basic needs of classroom automation. An important advantage of this system is that it gives the system as a complete prototype to develop more such cost-efficient systems that can be used in classrooms and college automation. Future work can be focused on developing applications that can help in automating an entire department or a college. Future work should be along the lines of considering the validation of the attendance also by including an image detection technique which will further more authenticate the person.

Keywords: *Automation, Database, phpMyAdmin, Coding, Energy Consumption.*

1. INTRODUCTION

Automation, not only makes life easy but it also reduces the efforts and increases the efficiency of any process. Automation or automatic control is the use of various control systems for operating various equipment whether

in a big industry to your sweet home. Automation is the technology by which a process or procedure is performed with minimum human assistance and efforts, hence has become more popular and quickly makes a better position in market and gives a greater field to work and research for the Engineers.In this project we are using Relay Switch to control electronics appliances and devices. The Relay is connected to the mobile device or PC with internet connection. An automatic fan and light is the part of this project, which is automatically switched On and Off according to the time table. Classroom automation basically focuses on the automation of lights and fans according to time table. The electricity loss will be reduced to a much larger extent by implementing this project. IOT or Internet of Things is a burning topic these days. It refers to a virtual internet connection from things, processes, people, animals and almost everything that we see around. It describes a situation where everything in our surrounding environment is made capable of automatically communicating with each other without any inter-human or human-to-machine interaction. Apart from the fact that it is a path-breaking discovery, it can also prove to be extremely beneficial in facilitating our lives to manifolds. The application of Internet of Things in the modern world is the centre of interest of many researchers and standardization bodies since several years. Thus, in order to achieve the dream of automation, we are giving a special attention to the treatment of the classroom automation.

2. LITERATURE SURVEY

This project is a complete prototype to build a smart classroom where lights and fans will be switched On and Off automatically according to time table scheduled for the classroom. This will lead to reduce the electricity charges to much extent. For controlling the appliances, we have used a microcontroller Arduino and Relay Switch. In this classroom automation project of IoT using Arduino, we have tried to sort out the problem of unnecessary electricity usage. As we have made a project which will be controlling the various appliances of a particular classroom according to time table scheduled in the class. Likewise, these appliances of every class can be controlled automatically according to its own scheduled class. In this particular project, we have made a database from which Arduino will be reading the values in the form of 0's and 1's and acting accordingly like if it fetches the value from a database as 0, then the appliances of that class will be turned off. Similarly, if it takes the value from a database as 1, then the appliances will be switched on. To make it more efficient, we have taken a column of time in database by which the Arduino will be judging when to switch on and off the appliances. Matching up with the day and time from the table, it will do the action more efficiently.

We have also managed to sort out the problem of a manual control. Manual control is an option that can be used in the case when the teacher needs to extend the class which is going to be conducted against the time table. Purpose of a manual control is to again make consumption of electricity more efficiently so as to reduce the wastage of electricity as to much extent as possible. We have made this functionality for various cases as when: The class gets cancelled, the teacher can manually switch off the appliances even though when the class is scheduled in the class if he is a valid user or has been earlier registered to do this activity.

i) The students bunk the class, in this case also the teacher has got the right to manually switch off the appliances of that class by signing in if he is a valid user.
ii)The teacher has to extend the class, then to make the appliances run continuously, the teacher has to login its details bit before the class gets over because if there will be no class after the current class which is going on, there will be interruption in the flow of electricity.
iii)Again after the manual control, there will no effect on the automatic controlling function unless the logger logs out or turns off the appliances. But as soon as the logger signs out or turns off, the automatic function will be activated and again the program will be executed according to coding done in the automatic function.

The automatic control technique for which Arduino is being used, if there is any glitch which could appear in future, to make it remove those glitches, we can use reset button which is placed in Arduino to deleted the code which was updated in the Arduino and we can change again or modify the source from where earlier that program was uploaded and again upload in the Arduino to make it run flawlessly. In our project, we have come across various modules and functionalities by the use of which the project has been made very efficient for the automatic and manual control, as it has also made the working and understanding of it more easy to carry upon.

3. METHODOLOGY

3.1 The Setup

The project consists of two modules:
i) Automatic
ii) Manual

i) Automatic:
In our project, the automatic module consists of different functionalities which will be controlling the fans, lights and other appliances placed in a particular classroom. In this module, the system's time will be depicted and checked on the weekdays and accordingly it will make the appliances i.e. fans, light or other one's to run.

a) Automatic (): In this particular function, database usage comes as it will check the weekdays and the current time and try to turn off the fan and light according to the values of "0" and "1". When "0" is read from the database of a weekday's column particularly, then it automatically turns the appliances off and when it fetches the value as "1", it will turn the appliances on.

- On (): This function will turn the appliances on when the value it fetches from the database as "1".
- Off (): This function will turn the appliances off when the value it fetches from the database as "0".

ii) Manual:
This particular module will be used when any registered user wants to switch on and off the appliances on and off manually. In this manual control, user has to enter his/her credentials to get to control the appliances of the class. If you are not a valid user, then it will not allow you to to control the appliances.

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There total of two functions used in this module-:

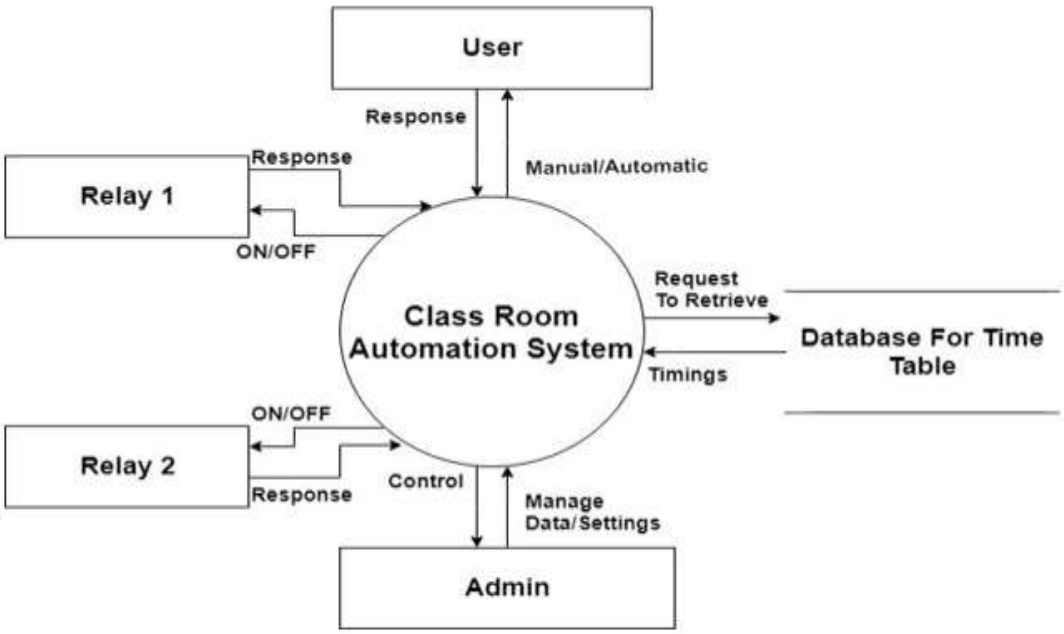
a) Database Check (): In this particular function, the username and password of the user will be checked, if valid then he can manually control the appliances of the classroom. When the user signs in successfully, then "Manual ()" function will be called and user does things according to the needs. If the credentials are unmatched, the error will be shown.

b) Manual (): This function will be called when the user signs in successfully. In this function after logging in, there will be two options available to the user, either to turn on or to turn off and when the user logs out ,the function call or control will be shifted to "Automatic()" again.

- Login (): This is a function in which we check the user details so that it can be checked whether a valid user is going to control or not.
- On (): This function will turn the appliances on only when user signs in successfully and clicks on turn on option.
- Off (): This function will turn the appliances off only when user signs in successfully and clicks on turn off option.

3.2 Data Flow Diagram

i) Level one DFD



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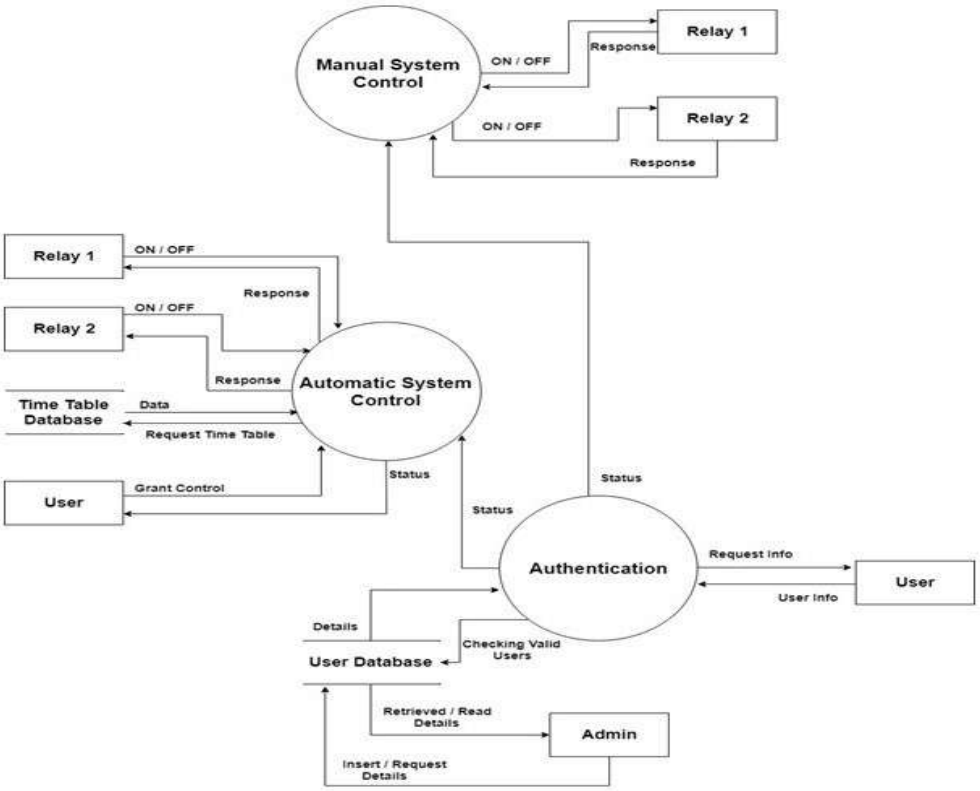
ii) Level Two DFD



3.3 Interface

i) Home Frame

ii) Login Frame

iii) Login Frame Warning Message

iv) Manual Frame

4. REQUIREMENTS

- Arduino
- XAMPP
- phpMyAdmin
- Relay switch

5. CONCLUSION

From this project we can conclude that by implementing this the lights and fans will switch off and on as per the requirement, and automation will save electricity. If electricity is needed during a particular time slot is also possible. This is a project that will help in automation and saving of the electricity. This model has been proposed to meet the basic needs of classroom automation. An important advantage of this system is that it gives the system as a complete prototype to develop more such cost- efficient systems that can be used in classrooms and college automation**.**

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