AUTOMATED LOAD MANAGEMENT SYSTEM AT COLLEGE

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Abstract: Due to increase in population and modernization electricity consumption has increased. With increase in electricity consumption there is a gap between generation and demand. To reduce the gap, we need to generate extra units or save units. Considering economy point of view energy conservation opportunity will be effective and quick. Energy management methodology can be used in colleges to reduce unwanted consumption. Energy conservation can be done by "IOT based automated load management system" making use of college time table and using Raspberry pi. Load can be managed to saved extra units. This will not only save extra units but also reduce harmful gases emitted by power generation house to the environment, which are contributing to the global warming. Real time energy monitoring and management assist consumers to overcome the burden of load shedding, energy surcharges and dependence on secondary energy sources like generators and inverters in residential buildings.

Index Terms - **Automated load management system, Energy conservation, Internet of thing, Raspberry pi, Real time energy monitoring.**

I. INTRODUCTION

The surge in energy demand escalating energy price and shortfall between energy demand and supply express the importance of load management. Real time monitoring, load scheduling will lead the consumer for optimized energy usage. Load management system based on IOT facilitates such requirement at ease in a benefit driven manner. IOT acts as communication link between things like load scheduling and internet for real time monitoring responsive control on energy utilization. This will enhance the energy saving opportunities by various means of load management. The main advantage of using this system is to turn ON/OFF the power based on specific rate timing set using an android app. This system will continuously monitor the timing to turn on a load and when the desired off time is set it executes the logic of turning off. A manual switch provision is also provided to assess the loads. Additionally, there will be automatic load control of the outside of the class or lab rooms based on light intensity, based on the light availability or not this system on/off the corridor lights. Through which enormous power saving will be achieved. The system is equipped with a single board computer Raspberry pi based, which runs on linux operating system, as well as load control relays to switch the loads and LDR sensors for calculating the light intensity. In existing system, the manual operation of the loads is done. Several times the users will forget to turn off the loads when work is done, and due to which wastage of electricity is increased as because of which power generated will be more. In this system there is monitoring and controlling of the load through any sort of application is available. IOT based load automation system can be controlled over mobile devices. This system can perform varied functions to be perform at college. This allows accessibility over internet from any corner in the world. The main focus of this project is to minimize the usage of electricity and reduced human efforts. The proposed system incorporates various aspects of technologies such as wireless network, communication over cloud. The users can access multiple appliances over the internet as per convenience. This is a low cost system. This system can control multiple devices
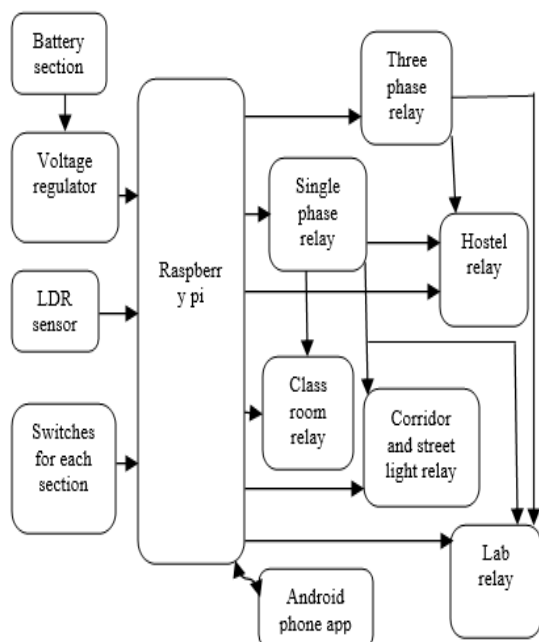
II. PROPOSED METHODOLOGY

Fig1. Block diagram of automated load
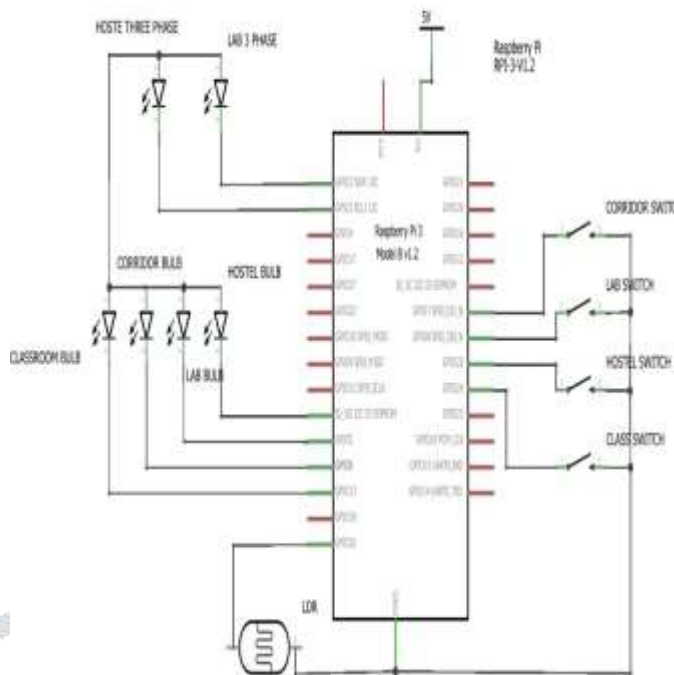management system

Fig2. Circuit diagram of automated load
management system

The software which is used in proposed system called Raspbian OS, which continuously monitor or examine the sensor and controls the relay. This section has three single phase relay section such as classroom relay, lab relay as well as hostel relay that gives ON time and OFF time to all three, the data of ON time and OFF time will be stored in data base in 24 hours' format, there will be a data base between Raspberry pi and android app. Whenever a save button is pressed, it immediately works out as per the timing. The data will be stored in sequential query language and as soon as the time occurs the electricity supply will get ON at that time. The time is continuously checked through the data base and compares with the timing of section i.e. lab, class and hostel. Here the condition is checked, whenever the classroom time occurs immediately the supply get turn ON by the interface called relay.

The signal will be sent to Raspberry pi to particular relay that has to be turned ON. Next program checks for switches of that particular classroom for the OFF time. The OFF time will be set into timer, as soon as the OFF time occurs it give signal that the time is up. That particular relay gets signal to switch OFF power supply of hostel as well as lab depending on schedule. Depending on schedule there will be single phase as well as three phase power supply. LDR sensor is used for corridor light relay. Raspbian operating system has been used on linux on C++ language.

LDR sensor which works on light intensity, whenever the changes occur in the light intensity the resistance value within that sensor keeps changing. Based on which we will connect it to a program which runs on Raspberry pi single board computer. LDR sensor is connected to GPIO pins and check light intensity that whether it is normal or low. One part of the program will be continuously monitoring the LDR sensor and other part of the program is communicating with the android app. This app is developed using platform MIT app inverter. An interface is designed, that has a dropdown which contains a section of ON/OFF time.

III. RESULT

MOBILE GUI FOR LOAD MANAGEM
ENT SYSTEM

Table 1: Result of automated load management system

SI NO.	Power supply to the various sources	schedule	condition	result
1	Class room	9AM	1	ON
		10 AM	0	OFF
2	Lab single phase	9 AM	1	ON
		1O AM	0	OFF
3	Lab three phase	10 AM	1	ON
		12PM	0	OFF
4	Hostel three phase	6AM	1	ON
		8AM	0	OFF
5	Hostel single phase	8AM	1	ON
		6AM	0	OFF
6	Corridor	6PM	1	ON
		6AM	0	OFF

IV. CONCLUSION

These kind of systems are required in the college campus as the area is very large and of rooms are more, human can make mistakes and forget to switch OFF the appliances when in no use and in these case, these systems are useful in order to increase the power efficiency. This system can be viewed as a future of artificial intelligence. These is a powerful and dependable system. It fulfills the goal of energy saving and helps in achieving the efficient use of energy resources. Study of various pages gives a better option of Wi-Fi enable processor instead of Bluetooth and ZigBee for communication and also to process the sensor data. Hence due to survey it became possible to make power cost efficient, full automated system. This system is taking a step forward towards the goal of increasing the technological advancement and smart city.

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