

Automation of Smart Lighting Control In College Premises

V.R.Deshmukh¹, P.A.Gadhav², M.R.Dalvi³, N.R.Kulkarni⁴

Department of Electrical Engineering

^{1,2,3}Students, P.E.S.'s Modern College Of Engineering, Pune

⁴H.O.D, P.E.S.'s Modern College Of Engineering, Pune

Abstract-Now a days we have seen that automation plays very important role and becoming more and more popular day by day due its numerous advantages. In this project there is an automated way of controlling lighting appliances through human interaction and through self-control of the system itself is provided and it is highly cost effective and reasonably priced. The main objective of this project is to smartly control the lighting and energy conservation. In this project we are doing Remote Monitoring & Control of lighting by controlling lux level as per our requirement. By using Portable Digital Addressable Lighting Interface(DALI) for Lighting Controls, JACE Model with Niagara framework having inbuilt Wi-Fi, mobile access using app through which we can change the lux level. Occupancy based sensor for switching or dimming of lights. Day light Harvesting by reducing overhead lighting use by : Utilizing the ambient (natural & artificial) light present in a space. Schedule based control is possible and as per our requirements lux levels can be set. The dimming and individual control capability provided by DALI enables considerable energy saving.

Keywords-DALI Drive, JACE Model, Niagara Framework, Lux+Occupancy Sensor, eDIM controller, DALI power supply, LED, IoT, Wireless LAN, Lux.

I. INTRODUCTION

The life is getting automated for the simplicity, security and saving electricity and time. So smart lighting automation is done without human efforts. It has been estimated that lighting accounts for about 20% of the total power generation of the world. The quality and quantity of light not only affects our health, comfort, safety and productivity but also affects the economy. With that energy conservation is very important factor. The main purpose is to make lighting controls easily accessible which enables residents to make the best use of lighting design. Selecting technologies and using them effectively is a true challenge. This project chooses smart lighting control, as light is the primary electrical appliance used anywhere in industrial and commercial area.

II. LITERATURE SURVEY

The main objective of this project is to sense the occupancy and movement of person and accordingly control the switching of light. In this lux level can be changed as per requirement and it is very helpful in energy conservation. Hence we can smartly control the lighting system.

In (Book), J.R. Coaton , A.M. Marsden and M.A Cayless have specified the Electric Lighting System , where the author has described the lighting design criteria. It describe the interior lighting design calculations.

In (website), John Parker Demand Media, he has mentioned how to conduct lighting audit consist of existing lighting fixtures in each functional area. He has also specified basic lighting audit tools, recording the audit, measuring performance, and recommending solutions.

III. BLOCK DIAGRAM DESCRIPTION

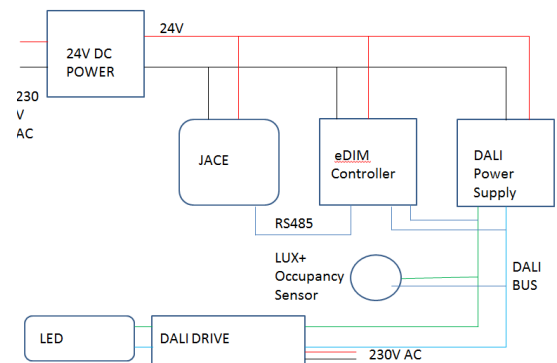


Fig No-1: Block Diagram

Figure shows the block diagram of the project. The power supply of 230V AC is given to the switch mode power supply (SMPS) which gives output of 24V DC. This output is then given to JACE model, eDIM controller, and DALI power supply. JACE model serve NIGARA platform for connecting multiple devices and sub-systems. With Internet connectivity and Web serving capability. RS485 protocol is used here for communication between JACE and eDIM controller. DALI

power supply provides a network on which LED and LUX+Occupancy based sensor are connected. LED have its own DALI driver which help it to dim-up and dim-down. Occupancy based sensor used to sense the occupancy and according to this it turn-on or turn-off the light and it also senses the lux level automatically and manually as per our requirement.

IV. RELATED WORK



Fig No-2: Project Model

Program is uploaded in a Niagara framework which helps to control this system by providing information about how much energy consumption is done in a day, month or in a year. JACE model provides wi-fi which we can connect to our mobile or laptop and operate the system. We can control the lux level as per our requirements by changing the lux level. We can turn-on or turn-off lights manually and automatically. Status of equipments can be checked either it is faulty or healthy. We are implementing this project in a small room for a demo purpose only by doing audit of particular room that how much lux is required in the room.

V. CONCLUSION

In this project we are using Lux+Occupancy sensor which senses the occupancy and control the turning on or off of lights. In the presence of day light it fulfills the requirement of the lux and than this sensor reduces light intensity which help to reduce energy consumption.

FUTURE SCOPE

Turn off lights in unoccupied areas. Control light (lux) level as per our requirement. Use of day light effectively.

REFERENCES

- [1] <https://www.tridium.com/~media/tridium/niagara%204/documentd/jace%208000%20data%20sheet.ashx?la=en>
- [2] http://www.control-network-solutions.co.uk/?post_type=document&p=4908
- [3] http://control-network-solutions.co.uk/?post_type=document&p=437