

REALTIME MONITORING SMART CLASSROOM USING RASPBERRY PI

Mr. Kirti Dhenge¹, Ankita gajbhiye², Chaitanya Kherde³, Mihir Nandeshwar⁴, Naman Gautam⁵

¹Assistant Professor Electrical Department KDK College Of Engineering Nagpur

²³⁴⁵Electrical Engineering Department KDK College Of Engineering

Abstract: In the era where technology plays an increasingly integral role in education, this study delves into realm of classroom automation leveraging raspberry pi technology. Focused on the control of lighting and ventilation system, the projects aim to revolutionize traditional classroom management approaches. Through meticulous hardware setup involving raspberry pi integration with webcam and relays coupled with software development utilizing python programming language. By automating the operation of lights and fans the system seeks to optimize energy consumption reduce cost and create a more sustainable learning environment. The outcome include improved energy efficiency, reduce bill cost, contributing to advancement of smart classroom technology

1.INTRODUCTION

In the recent years the integration of technology into educational environment has become increasingly prevalent, revolutionizing traditional teaching method and classroom management practice. One notable advancement in this domain is utilization of raspberry pi and webcam to automate the control of fans and lighting system in the classroom This system provides automated lighting and fan control which can help teachers and students to completely concentrate on lectures. It also useful for saving electrical energy which will reduce overall year bill of the institution.

Through a comprehensive examination of existing literature, case studies and practical application, it provides the understanding of raspberry pi and webcam technology which is used to automated the lighting and fan control system.

Raspberry pi 4b is used for analyzing the images and template sets to identify different figures which can be present in the classroom using Convolutional neural network and open cv. This project can also be used various application such as in computer labs, library and laboratory.

This foremost motivation is to create a system which can be installed in institutions for saving electrical energy. And also create a reliable control system for fans and lights.

2. COMPONENTS USED

1. Raspberry pi: Raspberry pi is a series of small low cost single board computers developed by raspberry pi foundation. These credit card size computers are designed to promote computer science education. Raspberry pi board typically include a CPU, RAM, USB ports, GPIO pins, HDML port for interfacing with external devices and other ports and connectors. Raspberry pi computers re versatile and can be used for wide Range of application including educational projects, home automation etc.



Fig.1 Raspberry Pi

2.Switched Mode Power Supply: SMPS it is a type of power supply circuit that converts electrical power efficiently from one source to another. SMPS commonly used to convert mains power supply ac to required dc voltage require by the components. SMPS are widely used in computers televisions, mobile phones due to their efficiency and compact size.

3. LM2596: the LM2596 is a step down (buck) convertor means it reduces the higher input voltage to lower voltage levels it can handle voltage levels to several volts above the desired output voltage levels. It gives higher efficiency, wide input voltage range, thermal shutdown and current limiting protection.

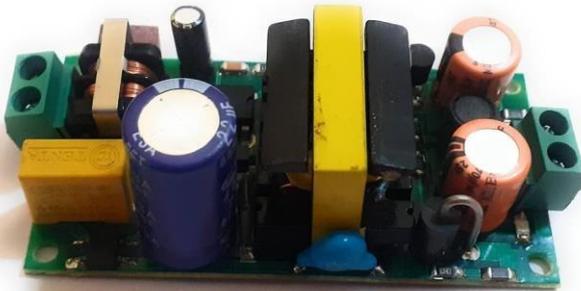


Fig 2. SMPS

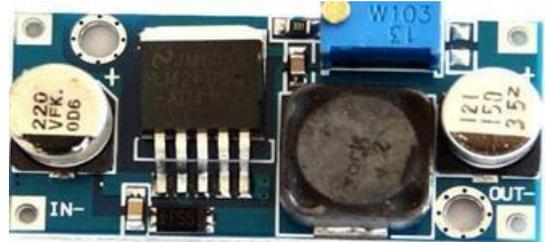


Fig 3. LM2596

3. BLOCK DIAGRAM

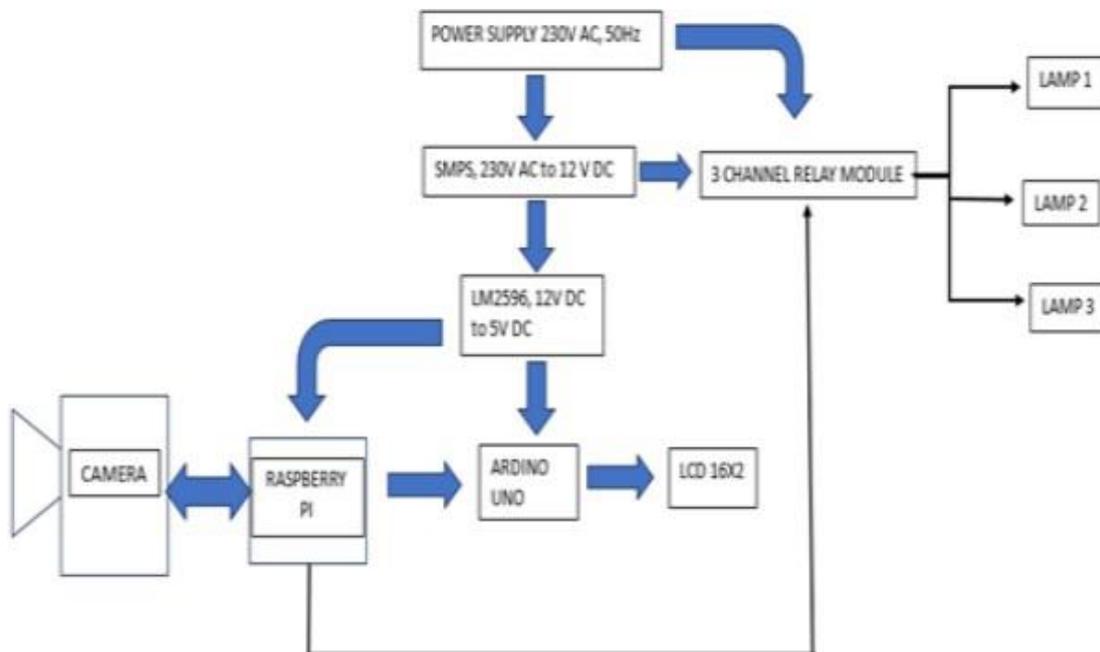


Fig.4 Block Diagram

3. PROPOSED MODEL

Step 1 Create xml file consisting of database. This database consisting of a set of images which include positive image set and negative image set.

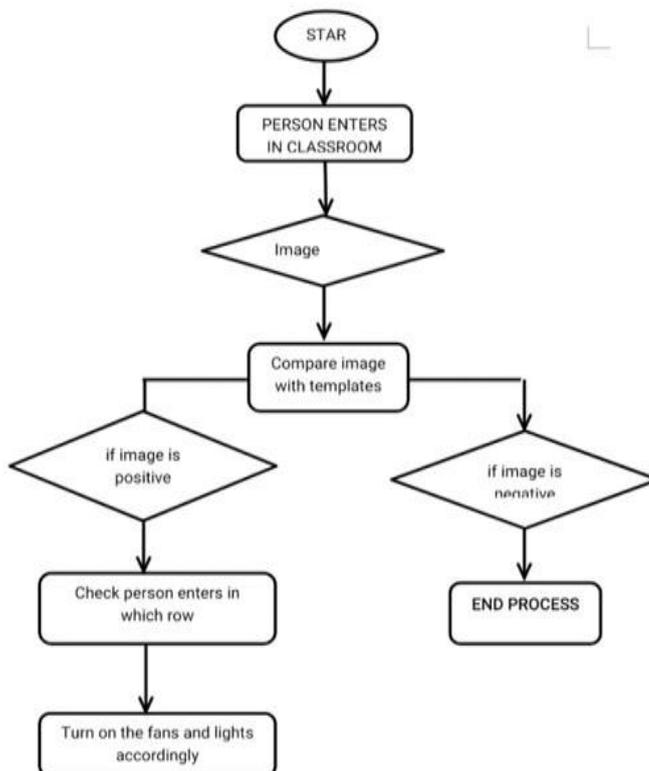
Step 2: when camera capture the real time image in the classroom then it will compare those images with positive & negative template files our code is program according to the templates set.

Step 3: When the person enters in a particular row it will count the distance with pixels accordingly as given in the program. The distance is measured with the reference of pixels.

Step 4: if the person enters in first row the lights and fans of the first row will turn on. Like that if person enters the second or third row fans lights of the particular row will turn on.

Step 5: when no one is present in classroom lights and fans of the classroom will turn of after 5 second.

4. FUNCTIONALITY CHART



5. CONCLUSION

The application of classroom automation using raspberry pi technology proposes auspicious opportunities to outdated traditional teaching practices. With the development of technology & improving automation system with hardware system as well as software This system can help us in saving electrical energy, provide sustainability, energy efficiency and also it can protect electrical equipment through which this system is connected. This system can also be used in computer labs, laboratory, auditoriums, library.

Our system has gone through many variations and modifications. Raspberry pi is minicomputer is which can assemble in electrical casing. There are several improvements which can be done in future.

6. FUTURE SCOPE

1. Using this system fan speed can be control according to temperature.
2. this system can be used in big halls as well as auditorium and hospital.
3. this system can also be used as a close circuit television.
4. It can replace the biometric attendance system in classroom and industries.
5. doors can be automated by using this system. 6. this system can also be used in ware houses.

7. REFERENCES

- [1] Md. Nahal Islam, Farah Tabassum, Gourab Kumar Sarker, Dhruvashish Sen, “Intelligent Classroom Management System” in BRAC University, December 2013.
- [2] Vinay sagar K N, Kusuma S M, “Home automation using internet of things, International Research Journal of Engineering and Technology”, in International Research Journal For Engineering and Technology Volume.
- [3] S.B. Chaudhari, Saurabh Khulpe, Pratik Patki, Kaustubh Kale, Dinesh Malage, “Classroom automation” International Journal of Advance Engineering and Research Development, Volume 3, Issue 3, March -2016
- [4] Singh, V.P., & Deshmukh, U. (2018). Facebook Based Home Appliances Control and Security Monitoring Using Raspberry PI 3. In IEEE Fourth International Conference on Computing Communication Control and Automation (ICCUBEA), 1-5.
- [5] Smart Auditorium Automation system based on object recognition Ansh Kapoor, Sarthak Shah, Shashank Agrawal, International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878 (Online), Volume-8 Issue-4, November 2019.