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An Efficient System for Power Saving of Electrical Devices Using Image Processing: A Review.

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Abstract*: The major problem in the most populated and developing countries like India, is Energy and Power crises. Hence there is a too much need of save energy. We use a several ways to save power like using the electric and electronic gadgets whenever and wherever needed and switching them off while not in use. But there are many places like classrooms, large auditoriums and meeting halls, there will be a fan or an Air-conditioner keeps running in unmanned area too, even before the people arrive. That improves the wastage of power in large amount and contributes to a considerable amount of electricity loss. As we all know about various methods for saving electricity like installing IR sensors to detect people etc. but it is quite costlier and complex in large areas. Here we propose a method of controlling power supply of auditoriums and classrooms using Image Processing. In this firstly we take reference image of empty classroom and if any changes in that reference image accordance with that power supply will turned on and off. This is very simple, efficient and cheaper technique to save energy. Also we include temperature sensor to sense temperature and calculate need of fan or equipments. Another big advantage is, we can extend this project up to application like home automation etc.

Keywords: Image Processing, Image Partitioning, Edge Detection, Threshold Determination.

I. INTRODUCTION

As we all know electricity is basic need of any business and we have to minimize any wastage of electricity. Video surveillance systems are widespread now a day. And it is widely use at airports, banks, casinos and correctional institutions. But now it is increased up to government agencies, business and even schools for increase security and provides video surveillance. As the availability of high speed, broad-band wireless networks and with the proliferation of inexpensive cameras, deploying a large number of cameras for security surveillance has become feasible with economical and technical manner. Several important research questions remain to be addressed before we can rely upon video surveillance as an effective tool for crime prevention, crime resolution and crime protection.

In video surveillance much of the current research focuses on algorithms to analyze video and other media from multiple sources for automatically detecting events. For eg. Intrusion detection, activity monitoring and pedestrian counting. Thus automated power management system is used to detect whether the room is empty or not. By using this technique we monitor changes in the auditorium through sequence of image and accordance with that the power supply is controlled. Image processing is a form of signal processing in that the input is an image and output may be either image or a set of characteristic related to the image.In this implementation first empty image is taken using digital camera then it is converted into gray and by using image enhancement technique we enhanced the image and apply edge detection. In the similar manner real time image is captured, enhanced and edge detected. Now the both images compared to each other and on the basis of results the control signal is generated by using hardware. Both images undergo the following processes

A. Acquisition
B. Gray Conversion
C. Partitioning
D. Edge Detection
E. Comparison
F. Generating control signal.

II. LITERATURE REVIEW

Literature survey is used to acquire knowledge and skill to complete this project. The main source for gaining the knowledge for this project is latest papers related on this topic. But there are some drawbacks of the previous research, to overcome that drawback and making the project more accurate we are doing several changes for making it more powerful algorithm.

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By doing study on the previous research.the following conclusions are taken under consideration.

Accordingly to "Anisha Gupta/Punit Gupta2,jasmeet Chhabra" [3] they proposed intelligent automated system for an efficient power management is being deployed and tested over institutional building in which the lights of the classrooms are automatically controlled by the IOT device. That sense the real time occupancy based on the schedule uploaded on the database server,and takes intelligent action of controlling the lights of classrooms using electromagnet relay switch. The IOT device used here is Intel Galileo board and the sensor used for sensing the real time occupancy in motion detector sensor. The proposed system architectureis explained which include server connected to Intel Galileo board that automatically controls the lights of the class by realizing the real time occupancy of detecting the class using motion sensor[3].

With respect to "N. Sribhagat Verma, Ganesh Taduri "[4] the need to automate the whole process of power management is very much there and this need is only going to escalate in the future with rising prices and scarcity of resources. Automated power management system is an effort in this direction and a small attempt to solve one of the biggest problems of mankind. With respect to our objective and scope,we have implemented and tested our system to the best possible. thus they calclude that automated power management system provides a practical and feasible approach to the problem of power management.[4]

"Kavya P. Walad, Jyoti Shetty "[5] they discussed about existing traffic control system and their drawback, to overcome from those drawback can build a flexible traffic light control system based on traffic density. To find traffic density edge detection technique can be used. the edge detection is a well known technique in image processing from identifying an image object, image segmentation, image enhancement. Each edge detection technique have its own advantages and disadvantages in various fields. Gradients based or first order edge detection and Laplace based or second order edge detection operators are discussed in this paper can be implemented in MATLAB. There are so many drawbacks with Gaussian based edge detection is sensitive to noise. This is because of using static dimension of kernel filer and its coefficients. The canny edge detection gives the best performance even in noise condition compared to the first order edge detection. This is more costly compared to the Sobel. Prewitt and Robert's operator. The main disadvantage with canny is that it has high computational time and responsible for weak edges. The best edge detection technique is necessary to provide an errorless solution. In future rather than using existing edge detection technique can use fuzzy logic and morphological based edge detection technique for regulating traffic control system based on traffic density to save the time and reduce operating cost.

Accordingly "Manoj Kumar Asst. Professor, Dept of CSE"[6] they calculated all the various steps done and various results are compared with test cases. Students can be at corner or they can be at in front in a group etc. Test case I display two students are sitting and their subtracted image is another image also test case II display two students are sitting and their subtracted image is shown in another image. The study shows that this method is helpful in saving electricity. This method is very cheap, efficient and can reduce wastage of power. This will consistently detect that is there any person in a classroom and auditorium and hence saves electricity.[6]

Accordingly "Vankatesh K and Sarath Kumar P "they conclude that image processing is better technique to control the power supply in the auditorium. It shows that it can reduce the wastage of electricity and avoids the free running of those electrical equipments. It is also more consistent in detecting presence of people because it uses real time images. Overall, the system is goog but it still needs improvement to achieve a hundred percent accuracy. If achieved, then we can extend this application to many places like theatres and even for home automation Also they proposed a scope for face detection.

With respect to "Shraddha Dhirde, Priyanka Ghuge, Sneha Khulape " they conclude that monitoring and controlling is done using parameter like temperature and human count by using Rasberry pi3. MB-LBP algorithm is implemented on the attributes of faces of people. This is one of the effective method to control the electric equipment and to reduce power consumption.

Kiiruthika G, Meenatchi R, Mohan raj[9] proposed a system that image processing is one of the useful technique to control the power supply in large areas like malls and auditorium. Also this prevents the free running of electrical application thereby reducing the power wastage. Also it proves to be a consistent and efficient technique to detect the presence of people since it uses real time image.

Patteri Sooraj, Faizankhan Pathan, Gohil Vishal[2] conclude that a classroom can be visualized where all the appliances can be controlled automatically without further human assistance. This makes the camera smart enough to monitor the electrical equipment and thus brings the whole idea of automation into classroom. Hence a lot of efforts and resources can be conserved which can be utilized for different purpose.

Vankatesh K developed a system in that image processing is main keyword to monitor the classroom and control power supply. The drawback with this system is that, it can be used only for the places whose orientation or arrangement is fixed. But they overcome it

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by resetting the reference images whenever the arrangement is altered. The main program needs not to be altered. Another way of overcoming this limitation is using face detection technique. That is expected to give much flexibility to the overall system.

For overcoming the previous problems related to the work, Here in this recent work we are using same technique of image processing with the temperature sensor and light sensor to sense the atmospheric temperature and light for calculating the need of appliances and making the system more accurate and convenient. In the alternation of face detection we are calculating the centred of object and on the basis of results, the operation will perform through microcontroller programming. In that we firstly take a reference image of empty classroom. This reference image compared to real time image after every 10 seconds. And with respect to changes, the operation will perform. There are many steps and parameter involves in this project that make it better and accurate than before.

III.CONCLUSION

The study showed that image processing is better technique to control the power supply in the classroom.This shows that it can minimize the wastage of electricity and avoid the free running of equipments. Also by using real time image we make it more consistent in detecting presence of people. Also by adding temperature and light sensor we make this system more accurate and convenient to use.

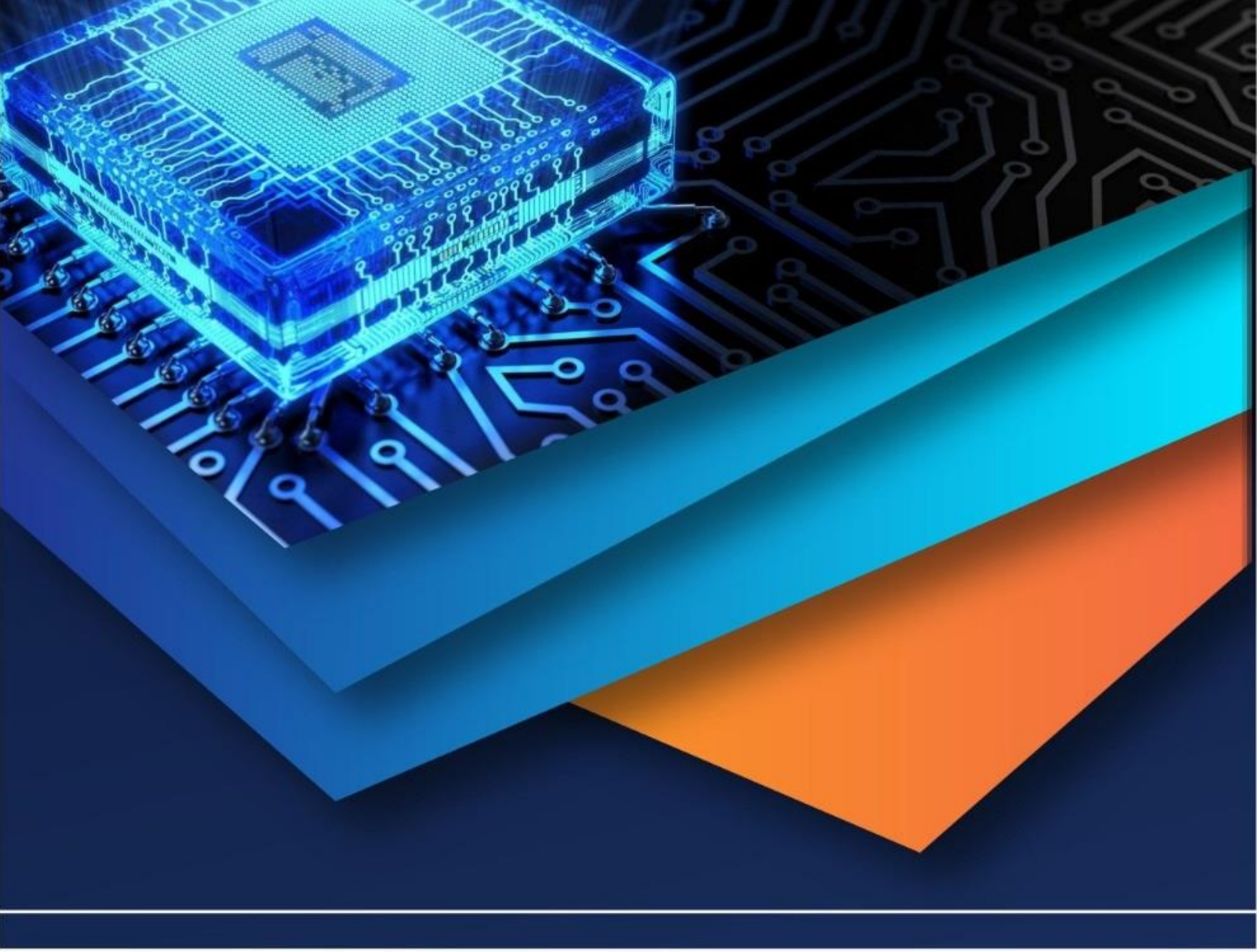
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