National Conference on Engineering Innovations and Solutions (NCEIS – 2018)
International Journal of Scientific Research in Computer Science, Engineering and Information Technology
© 2018 IJSRCSEIT | Volume 4 | Issue 6 | ISSN : 2456-3307

Automation Of Street Light System Using Qr Code To Avoid Wastage Of Electricity

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ABSTRACT

Automation, power consumption and cost efficiency are considered important in the present day to day life. In today's world, streetlights are very much required in populated regions. Due to busy lifestyle of humans, switching operations on streetlights are not carried out on time, and a huge amount of electricity is being wasted. In the present system it is observed that streetlights are not turned OFF even when there is ample amount of light after sun rise and are turned ON even before sunset. This results in delay after sunset and wastage of energy in the morning as the operator needs time to cross from street to street. This paper eliminates the above problems and also provides additional feature like real time controlling.

Every individual has access to smart phone and individual identity can be established by using Quick Response (QR) code. Hence we make an attempt to propose a system and its design where weautomate street lights using QR code in order to save electrical energy. In this paper we initially make a survey on various techniques used to automate and monitor street lights. We make an attempt to present what QR codes are and their application. Then we propose system design and finally we conclude by highlight the scope for further enhancement.

Keywords: Automation, Street light monitoring system, QR code, Energy optimization.

I. INTRODUCTION

The Street lights are the major requirements in today's life for safety purposes and avoiding accidents during night. Providing street lighting is one of the most important and expensive responsibilities of a city. The main consideration in the present field technologies are Automation, Power consumption and cost effectiveness. Automation is intended to reduce man power with the help of intelligent systems. Power saving is the main consideration forever as the sources of the power are getting diminished due to various reasons. Designing a cost-efficient system is very important as the requirement is more. In order to overcome this problem, automatic street light control methods are introduced. The main objective of our project is to provide a better solution to minimize the electrical wastage in operating street lights.

The proposed work is to control switching of street light using QR code using wireless communication. The proposed system utilizes specific and unique QR code generated to a street light. If an individual observes a street light being either ON or OFF during

unaltered time , he can access the street light by scanning the QR code with the right credentials.

NOTE : Unaltered time in this case is referred to a street light if turned ON from 6AM – 6PM and similarly if turned OFF during 6PM – 6AM.

II. PROBLEM STATEMENT

Now a day energy loss occurs in street lights during unaltered time (i.e., from morning 6am to evening 6pm) in this duration there is no need of street lights to be turned ON where in sometimes the street lights will be turned ON due to malfunctioning. The street lights are turned OFF if its turned ON in unaltered time using electric switches where it can be again turned ON. If the street lights are of older version there is no option for turning OFF the street lights during unaltered time and people used to plug off the wire or disconnect the wire to switch OFF the street light where it can be a threat to human life.

III. LITERATURE SURVEY

Figure 1 shows a sample case where in the street lights were reported to be turned ON for 2 days and this issue was unreported for their repair and maintenance.

When energy crisis is a big threat and unscheduled power cuts are the order of the day, street lights can be seen burning during daytime in many parts of the city.A scathing audit of the city of San Diego's street light repairs finds the service does not operate efficiently.

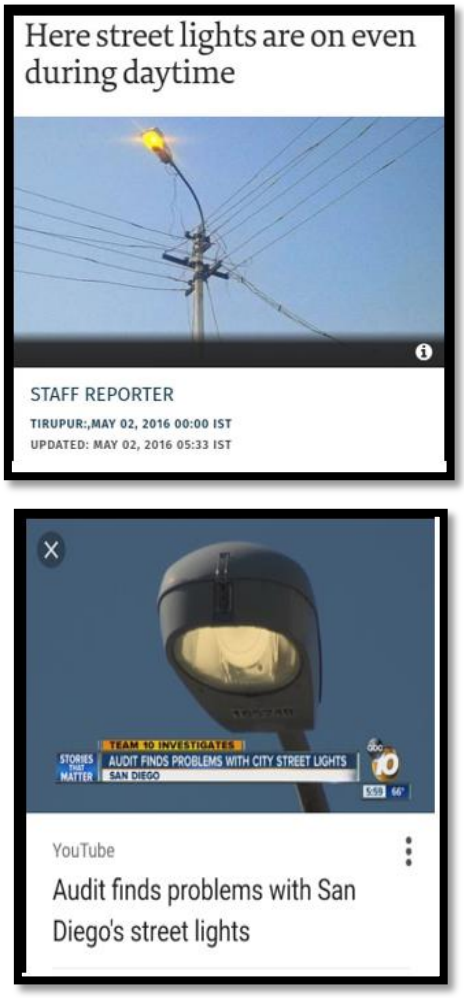

Figure 1. A report from few local newspapers where in street light was kept on with for 2 days.

Automatic Street Lights,

In order to overcome the above problem, there are few projectsin which human interference to control the power consumptions at the streets have been eliminated. This includes controlling a circuit of street lights with specific Sensors, LDR and Microcontrollers during day and night. This requires three basic components i.e. LDR, Sensors and microcontroller. During daytime there is no requirement of street lights so the LDR keeps the street light off until the light level is low or the frequency of light is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Thus the street lights do not glow. The below mentioned are few street light monitoring systems which are proposed and used.

Automatic Street Light Control System Using Microcontroller, This paper aims at designing and executing the advanced development in embedded systems for energy saving of street lights. Nowadays, human has become too busy, and is unable to find time even to switch the lights wherever not necessary. This paper gives the best solution for electrical power wastage. Also the manual operation of the lighting system is completely eliminated. In this paper the two sensors are used which are Light Dependent Resistor LDR sensor to indicate a day/night time and the photoelectric sensors to detect the movement on the street. the microcontroller PIC16F877A is used as brain to control the street light system, where the programming language used for developing the software to the microcontroller is C-language.

Intelligent Street Lighting System Using GSM, Conventional street lighting systems in areas with a low frequency of passers are by online most of the night without purpose. The consequence is that a large amount of power is wasted meaninglessly. With the broad availability of flexible-lighting technology like light-emitting diode lamps and everywhere available wireless internet connection, fast reacting, reliably operating, and power-conserving street lighting systems become reality. The purpose of this work is to describe the Intelligent Street Lighting (ISL) system, a first approach to accomplish the demand for flexible public lighting systems.

GSM based smart street light monitoring and control system, it is an automated system designed to increase the efficiency and accuracy of an industry by automatically timed controlled switching of street lights they are basically two modules which include the client side and the server side. the client side consists of GSM modem which is further connected to the microcontroller. the server side consist of java based web server

Arm Based Street Lighting System with Fault Detection, In this paper a new innovative street light system with optimized street light management and efficiency is presented. It uses many sensors to control and guarantee a better efficient system. Presence of a person or an obstacle is detected by using the presence detector sensors. Street lights will be switched ON only when a person or an obstacle comes in the detection range else it will be switched OFF. Wireless communication uses GSM devices which allow more efficient street lamp management system and control. Arm processor will check the state of street lamp and informs through GSM module to the control by sending a message to the prescribed number. The system allows substantial energy savings with increased performance and maintainability. By using this system the manual works will be reduced to a great extent

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EXISTING SYSTEM

Street light is poorly designed and inadequately maintained, there are large number of burned out lamps which leads to insecurity. There is a complaint register in every zonal office street light section. It is being maintained by the line inspector. The complaint received from public, councilors and corporation officials either over phone is in person being recorded in the complaint register. The complaint thus entered is being handed over to the fieldwork man so as to rectify the complaints. the field staff will have the rounds in the respective areas twice in a week and the complaints about non

burning are also being attended then and there. But this is not the immediate remedy on complaints and has many disadvantages like the repair work takes days/even months instead of taking few hours which results in delay, telephone line may be busy, sometimes no response.

Operating street light manully

Figure 2: The switches of street lights are switched ON/OFF manually by the workman in all the zones. This leads to the rise of man power and time. As it is human operation it is prone to errors.

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IV. PROPOSED SYSTEM

The objective of the project is to design a street lights where the street lights can be monitored by the public when the street lights are ON/OFF in unaltered time by using QR code, And even the complaints can be lodge by the public when failed to monitor the street light ,the energy saving and autonomous operation on economical affordable for the streets and immediate remedy on complaints. Moreover, errors which occur due to manual operation can also be eliminated. As all the Street Lights can be switched ON/OFF through computer from central control station and no labor is required for switching ON/OFF. Doing all these in turn increases the performance and life of the lamps.

Functionalities of the project

- ✓ Switch on and offthe street light using QR code in unaltered time.
- ✓ Public can also lodge complaints when failed to monitor the street light.
- ✓ Bill Payment.
- ✓ Street light fault detection.
- ✓ If complaint not rectified by area wise system then information tohigher leveloffice(Zonal level) based on some constraint like not rectified even after two days.
- ✓ The useful information is collected from the street light at the end of each day this information is stored in a database and based on this information charts are derived.
- ✓ Chart contains information like, Power consumption, Total number of burning hours, and total number of interruptions.

QR code

QR code abbreviated from Quick response code) is the trade mark for a type of matrix barcode (2-D barcode) first designed for the automotive industry in Japan. A barcode is a machine-readable optical label that contains information about the item to which it is attached.A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to efficiently store data; extensions may also be used. QR codes have become common in consumer advertising. Typically, a smartphone is used as a QR code

scanner, displaying the code and converting it to some useful form (such as standard URL for a website, thereby obviating the need for a user to type it into a web browser). User with a camera phone equipped with correct reader applicationcan scan the image of a QR code to display text, contact information, connect to wireless network, or open a webpage in the telephone's browser. Either the application that scan the QR code retrieves the geo information by using GPS and cell tower triangulation or the URL encoded in the QR code itself is associated with a location.

Figure 3. A sample QR Code

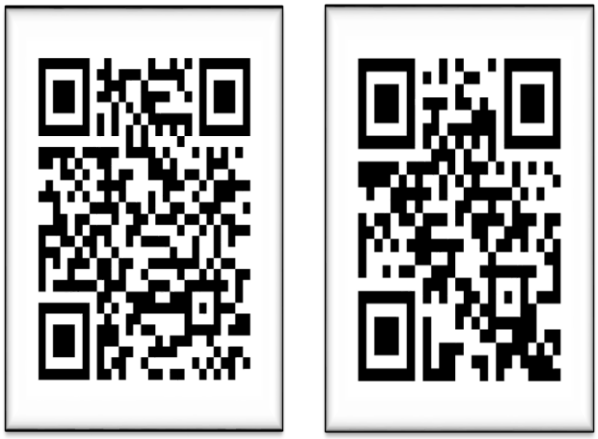


Figure 4. QR code samples to retrieve GPS location and URL

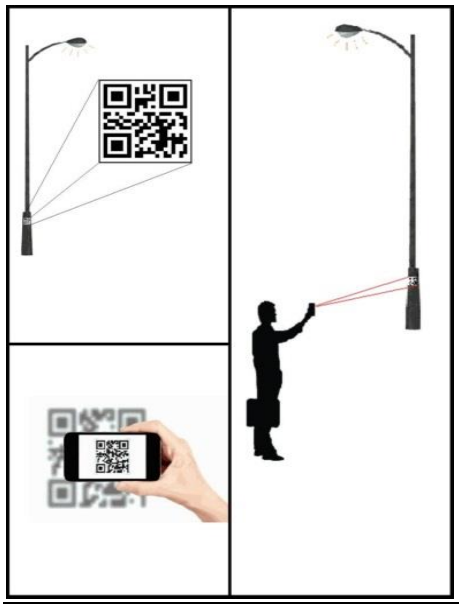


Figure 5. Picture depicting usage of QR code in street light monitoring

Working:

- As mentioned in the introduction part the proposed system utilizes specific and unique QR code generated to a particular street light where an individual public who observes a particular street light is either ON or OFF during unaltered time can access the particular street light by scanning the QR code.
- Once the code gets scanned the user gets an access to automate the street light via internet.
- The access made by the user if found genuine then a webpage will be popped out to automate the street light.
- Here the access mode and genuineness is calculated by generating the QR code in such a way by restricting the unwanted access. For this restriction to be done the QR code will be coded on the basis of :
  - ✓ Authorized access
  - ✓ Unauthorized access.

If the user fails to automate the street light (turning it OFF/ON during unaltered time) getsoptions to:

a. Share the geographical location of the street light so the authority responsible for this will be alerted for immediate repair.

b. Write a complaint regarding the repair and maintenance of street light via message.

c. Calling the authority for immediate repair and maintenance.

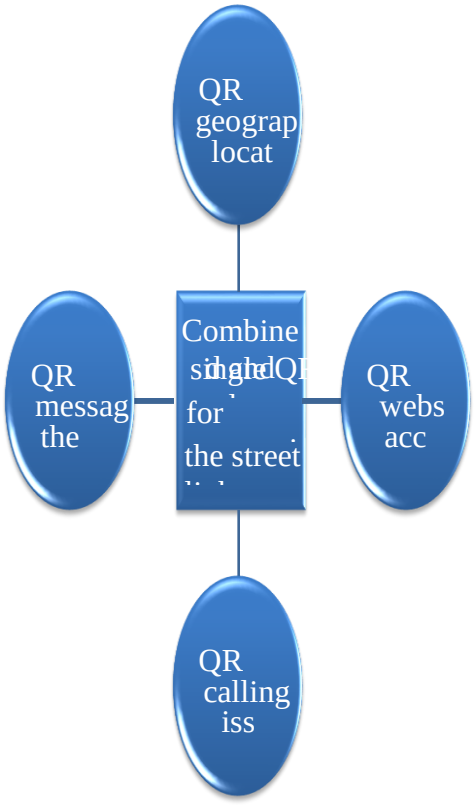
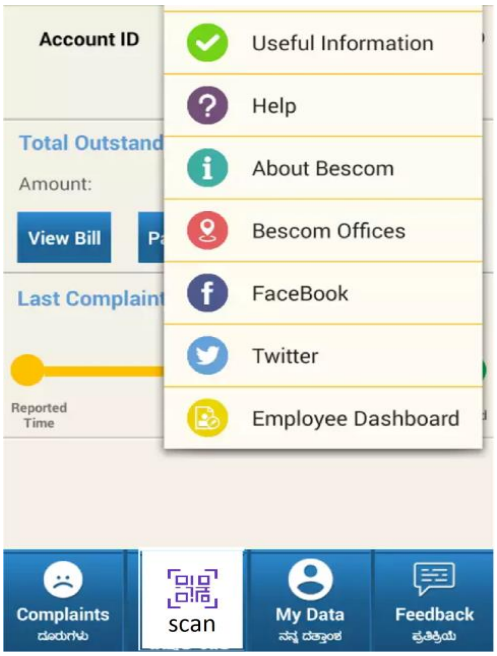
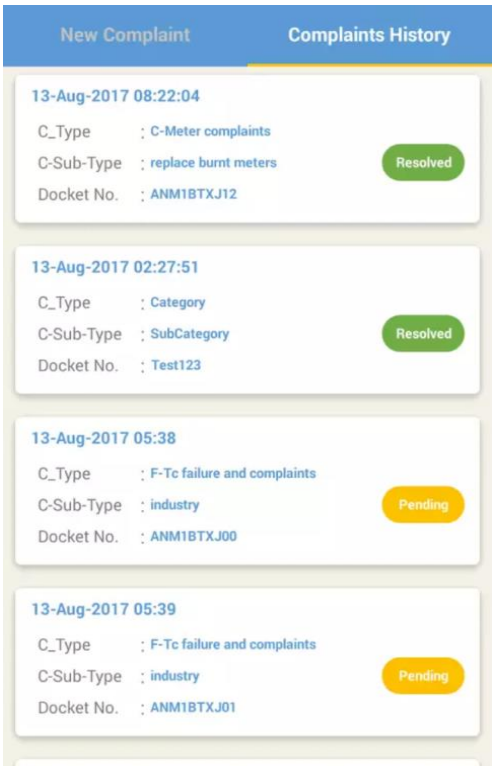


Figure 6. QR code usage in the proposed system

UI DESIGN

Initial UI design shows login /register page ,for scanning, complaint status view, reporting a complaint





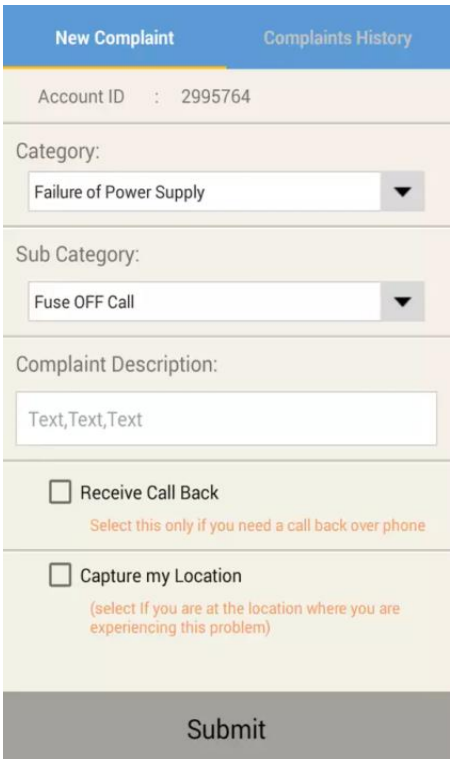


Figure 7. User Interface of mobile application

Figure 7 shows the Use Case diagram that introduces the major characters of the project i.e. Admin, System/Application , Street light and the worker . It also mentions their respective functions and the operations they are involved in.

The admin is mainly responsible for managing the area and also responsible for when to start or stop the service. System/application is mainly used by public to ON /OFF the street lights in unaltered time by scanning the QR code. The Street light actor report the failure to system then the system sends SMS based alerts to the authorized worker.

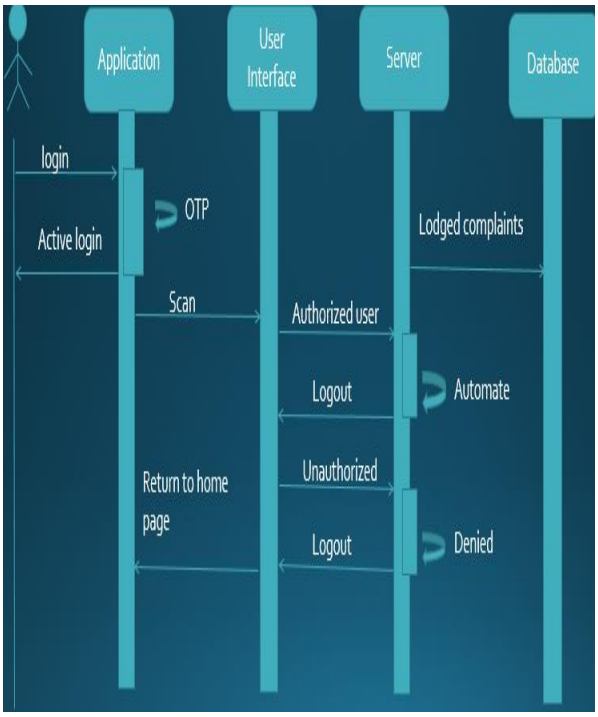


Figure 8. Sequence diagram to show system usage

Figure 8 showsthe step by step tasks that occur during the course of the project are mapped using the Sequence system. A continuously running application manages the database containing the number of areas, number of street light poles, information regarding the workman assigned to a street etc.it also periodically allow public to get register and to monitor the street light i.e. switch ON/OFF street light in unaltered time by scanning QR code if user fails to monitor the street light then user can also lodge complaints where admin is notified about the complaint which is stored in database and message is sent to the concerned workman to rectify the problem and also to the application system to update the database. The user can also view the updates done in database by the admin.

ACTORS

1. **KEB server**
   - Manage streetlights.
   - View and process complaint.
2. **End user**
   - Register and login.
   - Scan QR code.

- Control street lights.
- Register complaints.
- View complaint status.

ACCESS MODE

AUTHORIZED USER

- ✓ The street light if turned ON during day time. By scanning the QR code the user get a successful access to turn OFF the street light.
- ✓
- ✓ The street light if turned OFF during night time. By scanning the QR code the user get a successful access to turn ON the street light.

UNAUTHORIZED USER

- ✓ The street light if turned OFF during day time. By scanning the QR code the user will get access denied message for unwanted usage of this project.
- ✓ The street light if turned ON during night time. By scanning the QR code the user again get same access denied message.

V. CONCLUSION

The system for automatic control of street light using QR code helps to save a large amount of electric power which is wasted in conventional street lighting system. The turning ON or OFF the street light in unaltered time can be made by public by using QR code. Furthermore, the drawback of the street light system by just using timer controller has been overcome, where the system depends on both timer and Arduino uno microcontroller.

VI. REFERENCES

[1] Mustafa Saad, Abdalhalim Farij, Ahamed Salah "Automatic Street Light Control using Microcontroller," International Journal of Engineering Research and Applications, vol. 3, no. 2, pp. 92-96, 2013.

[2] SharathPatil G.S, Rudresh S. M, Kallendrachari.K. Vani. H.V, "Design and Implementation of Automatic Street Light Control Using Sensors and Solar Panel," International Journal of Engineering Research and Applications, vol. 5, no. 6, pp. 97-100, June 2015.

[3] Abdul Latif Saleem, Raj Sagar. R, Sachin Datta N. S, Usha MS., "Street Light Monitoring and Control System," International Journal of Engineering and Control System, vol. 1, no. 2, pp. 68-71, April 2015.

[4] Donald A.Cleland, "Street Light Monitoring and Control". United States of America Patent US 8,290,710 B2, 16 October 2012.

[5] A. Somasekhar, B.Umakanth, “An Intelligent Lightening System for Power Saving Applications”, International Journal of Engineering Trends and Technology (IJETT). Volume 13 Number 1 – Jul 2014. ISSN: 2231-5381.