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Smart Electric Pole

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Abstract : ***The conventional smart street lighting maintenance and control system still remains ancient in this scenario of revolution and technological innovation. The evolution of the Internet and technology has been a benevolent cornerstone for such revolutionary giant of the web or today world. Hence we use highly passionate innovation to cater the maintenance and control processes of smart street lighting pole system. The proposed system enables maintenance and control of the street lights and makes it easier to monitor and control its operation. The system will detect day and night by using LDR(light independent resistor) sensor. This application will have the following features viz. solar panel with street light sensor and GSM(global service module) along with relay operation with microcontroller programming. It focus to design a intelligent or smart electric pole which is free of any kind human intervention in switch ON/OFF of light. Present state of affair, the street lights are switched ON at a night when sunlight decreases and is switched OFF the next morning when sunlight increases. Power supply is from solar panel when sunlight falls its panel start charging. This project gives a solution for maximizes the ability to control the street lamps remotely and efficiently.***
Keywords: automatic light sensor, LDR (light dependent resistor), smart pole, solar panel, relay, GSM (global service module)

I. INTRODUCTION

This project presents an idea or innovation of developing an automatic light sensor to monitor and control streetlights efficiently and improve its time saving facilities. In a Current days, street lights are the most important aspect of the city as it leads to most of the accidents due to dim light. Lighting creates large amount of load when used in offices and large complexes. The energy saving potential is often ignored. According to a survey about 4400MW of power is consume in India on street pole lightning. Therefore, the street lights are relatively simple but with the development of urbanization, the number of streets increases rapidly with high traffic density.

To detect the night and day in the remote location and urban places the proposed system is very much better, functional, practical, helpful and applicable serviceable. Based at the aforementioned concerns, invention in efficient street lightning control segment is a must. We advise a scalable, holistic and efficient response that provides lightning only when necessary (consistent with the instant day or night conditions) with the goal of decreasing the associated cost of the municipal corporation, assist the financial restoration. The installation price will be decreased to the minimal with the use of solar panel, LDR sensor, street light and independent performance modes along with automatic. Most of these enhancements need to be taken into consideration to obtain a sizeable reduction of the energy intake in lights and therefore contribute to the sustainable improvement. It will also make large contributions to the safety and security of the metropolis roads by providing sufficient amount of intensity light which stop accidents. Also an over-current situation may cause short circuiting which may lead to fatal accidents but with the help of LDR sensor allows proper amount of current. Thus sensors are used to detect the current flow in order to avoid any misfortune.

II. USEFULNESS

The approach is extremely useful for solving the purpose of automatic street lightning detection and solar panel with LDR sensor which saves electricity as well as optimizes power on a large scale. It can prevent and avoid a number of minor and major accidents which could be fatal as well, due to its powerful sensors that will help to keep the status of the pole updated at the independence of control rooms or manually.

There is no limit of this features and function that can be integrated into intelligent pole. Relay segment help in to cut the supply connectivity from user it is useful when user not pay our bill on time. At the time of breaking connectivity there is message generated automatically in user mobile the message is like that “LOW BALANCE, SUPPLY CUT” and then customer will pay our balance on time. It is done by the help of microcontroller.

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III. PROBLEM STATEMENT

The smart street light is one of the most seek after and significant aspect in a city as well as remote areas that rules the roads during the dark hours and contributes largely to the safety and well-being of the citizens. The amount spent behind this is often neglected but extremely important pole is huge due to sodium vapor lamps being utilized as its luminaires that consume high power. The expense spent on the street light can be used for other development of the nation. Currently a manual system is used where the poles are lighted during the dusk and put off when dawn.

In the currently existing system the workers need to manually check the balance of customer in the streetlight or from pole rather be intimated by a worker or a resident of that area for immediate action. This system has a huge drawback as it increases manual effort and the need of manual maintenance. The traditional system takes lots of time to disconnect connection from pole but relay will disconnect only by pressing button.

IV. LIMITATIONS OF EXISTING SYSTEM

It takes manpower to maintain and control the streetlights switch on and off.

It is a time consuming process.

Until and unless there is a complaint or the maintenance personnel goes for a check there is no line man will come at home.

There is no facility of message when customer connection cut as a form of alert.Not presence of button to disconnect power supply of customer from the pole directly.

A. Proposed System

Our proposed system enables maintenance and control of electric poles i.e. the streetlights and connection of customer. It will be easier to monitor and control the operation of streetlights by LDR sensor. The system will provide directly disconnection of customer and generate a automatically message as an alert to take an immediate action by paying balance. An overview of the suggests system is stated below: The system involves sensing parameters of the pole in order to take necessary further action. The microcontroller is used in the circuit which will assist in message generation and sending by the help of GSM. Relay instrument will be used which shows connection goes through relay from pole to customer. Customer will pay our balance on time. It is done by the help of microcontroller. The LDR sensor will sense and then allow the current for growing light of the pole. GSM is a cellular network. Networks operate in four different frequency ranges. Most GSM networks works in the 900 MHz or 1800 MHz bands.

Some simple command that are used when we utilize the feature of GSM are as follows-

Testing :

Command	Description
AT	Checking communication between the module and computer.

Call control :

Command	Description
ATA	Answer command
ATD	Dial command
ATH	Hang up call
ATL	Monitor speaker loudness
ATM	Monitor speaker mode
ATO	Go on-line
ATP	Set pulse dial as default
ATT	Set tone dial as default
AT+CSTA	Select type of address
AT+CRC	Cellular result codes

Table 1 – Shows basic command of GSM

V. RELATED WORK

Past work has been referred which proposes a lot of challenges related to the street lightning.

In 2016, Peter Horvath, Andras Timar, Andras Poppe, has written a paper that recommend the integration of LEDs as a replacement to mercury vapour lamps as light sources revolutionized the example. It facilitates intelligent remote control as well as ability to adopt to the surroundings conditions. In 2015, K.Abhishek And K.Srikanth, has written a paper that demonstrate an energy efficient solution to control the street light by using LED and ZigBee protocol. In 2017, J.Arthi, W.Lydiapreethi, B. Gunasundari, has written a paper that indicate the elimination of manual control operation for controlling the street lights by making it smart using different IOT.

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A. AIM and Objective

1) AIM : In the state of present era, the maintenance and automation process of streetlights is completely manual. The basic aim of our proposed system is to automate this entire process to save time, energy, increase profit and resources also increase the feasibility and efficiency.

Overcome the drawbacks of the existing application.
Alternative to traditional maintenance and control process of streetlights.
Increase profits of power cooperation and time saving.

2) Objective: The following are some more objectives of smart electric pole:

The application would be able to detect environment easily that is day or night which make switch ON/OFF of street lights.
Power saving.
The application will use GSM and microcontroller relay which help in to send message of balance alerts.
Also the application will help avoid mishap accidents which can be caused by either dim light of the pole or excess current generation, the sensors will help keep the status of poles updated.
The use of current LDR sensor facilitates load detection and management, power supply control, and over current fault detection and protection of misfortune.

B. Scope

This application can help reduce manpower by automatic system the traditional methods of maintenance and control of lightning system this also help in disconnection of customer from the electric pole.
Connection of solar panel helps in saving energy and makes its greenery environment. We can extend this project by increasing the no. of more feature connecting to this electric pole circuit. Also, we can integrate mobile charging system , CCTV, IoT, wi-fi system, weather sensor, public announcement speaker, digital display board, soil moisture sensor, pollution sensor and IoT vehicle tracking etc so as to use solar energy in order to light the uminaries in the lamps which will in turn harvest natural resource and save conventional energy.

VI. METHODOLOGY

Main methodology implemented for our project development is microcontroller. The system involves sensing various parameters of the pole in order to take necessary further action. The microcontroller is used in the circuit which consists of an inbuilt Wi-Fi module which will assist in message generation and sending text based on Operating System which is microcontroller. The internet data we get by connecting mobile by Bluetooth.
The LDR sensor will sense the intensity of light of the pole i.e streetlight bulb, if the required threshold value condition is fulfilled, the light works fine, other feature using relay operation a message will be generated when customer not pay our bill on time in other word their balance will end that maintenance is required. Comparison of threshold value is done by comparator in LDR connection of street light.
The methodology which are used in this project are represented by block diagram are as follows ---

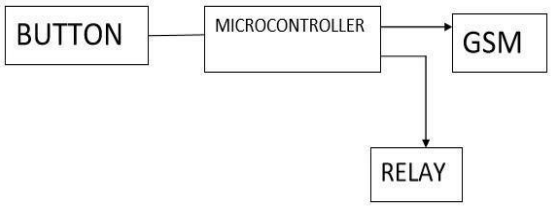


Fig. 1 – Block diagram which shows connection of GSM, relay, microcontroller and button



Fig. 2 – Block diagram which shows connection of LDR sensor, comparator and street light

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In microcontroller there is proper programming is done to control internal feature by using suitable proper command.

A. Advantages

1) Connectivity with remote area increases.
2) Automatic Controllability increases.
3) Time and power supply consume less.
4) Eco-friendly in nature.
5) Accident cases reduces.

B. Future Scope

1) *Mobility Increases :* The future belongs to electric vehicles . they need more public charging points in order to use even more widely .therefore charging smart pole is benefit for us.Connectivity become more stronger Million of people using smartphone , public internet connection points are increase in demand then ever before this smart electric pole come into play in future. It help to increase rural and remote area network
2) *Cost Efficiency:* Street light is need of modernisation incur high costs. The LED lights used in the smart poles preserve council energy utilities and companies wealth.
3) *Security:* Our intelligent street lights provide security through integrated panic buttons of relay.
4) *Sustainability:* In order for the energy transition to succeed municipalities must achieve there emmition target of smart pole can help to achieve this.

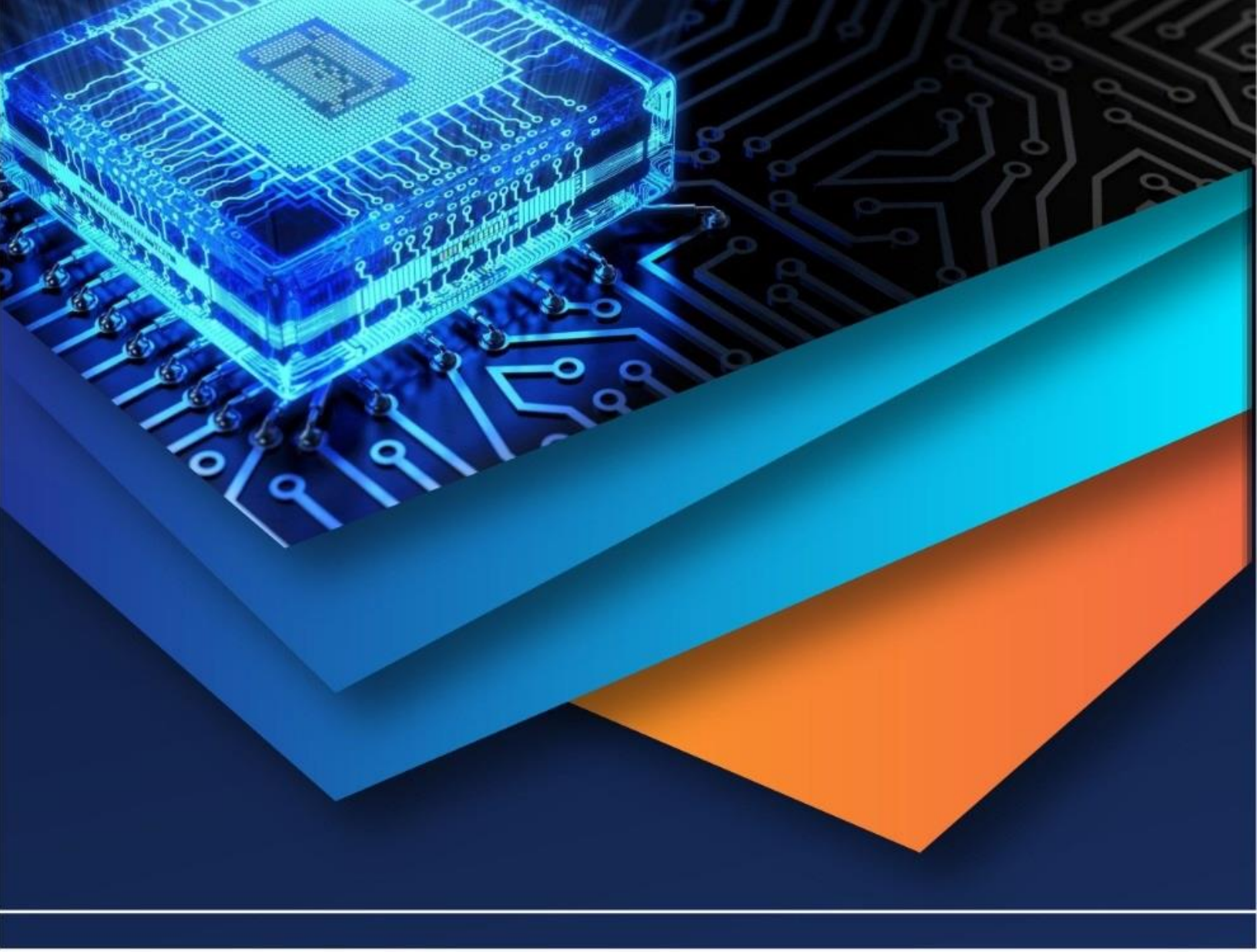
VII. CONCLUSION

The negligence of the streetlights maintenance could have heavily burdened the government to exceeding cost, delay in maintenance and controlling operation. The manual controlling of streetlights can lead to delay in maintenance work. The proposed project will eliminate this anomaly and improve efficiency and controllability of the city poles that prove to be an essential aspect for the well being and safety of the citizens.

REFERENCES

[1] IoT based smart LED street lightning system https://ieeexplore.ieee.org/document/7745518/
[2] IoT based smart street light management system https://ieeexplore.ieee.org/document/8326023/
[3] IoT based street lighting and traffic management system https://ieeexplore.ieee.org/document/8288921/
[4] IoT based smart Electric Pole https://ieeexplore.ieee.org/document/8474773/
[5] Scenario planning for 5G light poles in smart cities https://ieeexplore.ieee.org/document/8260984/
[6] Intelligent street light system based on NB-IoT and Energy-saving algorithmhttps://ieeexplore.ieee.org/document/844306/
[7] Light pole localization in smart cities https://ieeexplore.ieee.org/document/7005300
[8] IoT based smart led street lighting system: https://ieeexplore.ieee.org/abstract/document/79727/24
[9] Kudakechetan Ashok1, Shirsath Shravan Bhaskar2, KapseSagar Sudhakar3, AbhaleAmol Anil4 "Automatic Street Light Control System" International Journal of Emerging Technology and Advanced Engineering" May 2013 Volume 3, Issue 5
[10] Lightning the cities – accelerating the deployment of innovative lightning in European cities. Office des publications de 1'union europeenne 2012.

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