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IOT based Force Resourceful Street Light Monitoring System

Dr. Saravanan. A¹, Aanandhi. S², Yuvasri. S³

¹Professor, Department of Electrical and Electronics, Dhaanish Ahmed College of Engineering, India

^{2,3}BE- Final Year, Department of Electrical and Electronics, Dhaanish Ahmed College of Engineering, India

Abstract: *This project proposed with a new innovative street light system using LED array. It uses many sensors to control and offer a more efficient system. D6T thermal sensor is an extremely sensitive sensor is used to detect presence of a person. Street lights will be switched ON only when a person comes in the detection range otherwise, it will be switched off. PIC controller is used to check the state of street lamp and informs to TNEB by sending the message through IOT technology. The system allows abundant energy savings with increased consummation and maintainability. The manual works will be reduced to a greater extent.*

Keywords: *Human sensing, Dimming, Power consumption, street lightning, LED street lamps, IOT.*

I. INTRODUCTION

Street lamp lightning is the part of infrastructure, which plays a major role in the society. Road lighting is an application of the illumination system along roadways for the purpose of improving safety by increasing visibility of the roadside hazards. One of major duties of the electrical distribution companies is to maintain the street lightning network.

Since monitoring the street light management system, IOT is used to send message to the cloud page. We will benefit from saving the time, maintenance cost is less and system reliability is higher. Energy consumption is less using IOT technology.

Wireless street lightning system using D6T thermal sensors are able to make the system more innovative and flexible. A network of sensors is used to collect the relevant information to the cloud page, transferring the information via wireless using IOT technology and the maintenance of the street light is less.

II. LITERATURE REVIEW

R.Abinaya[1] proposed that street light system can be detected using day night sensing unit and piezoelectric sensor to detect the vehicle movements. They accordingly switch on the lights.

When there is no vehicle on highway, all the lights remains off.

Ms. Dongre[2] proposed that the street light can be monitored and controlled by using gsm technology. The energy from the solar panel is saving the battery and the supply is given to the street light and sensor. The intelligent system light turns the light on and off depending on the vehicle or pedestrian movement.

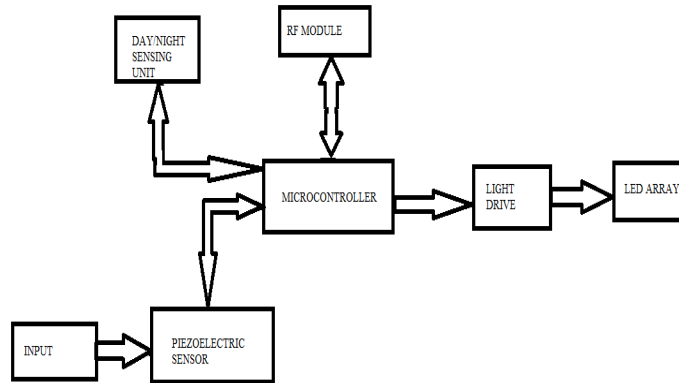
Abdul latif saleem[3] proposed that street light can be controlled and monitored by using light sensor. The faulty street light can be detected and also maintains the database to store power consumption, total number of interruption, details of fault detection. The lights automatically switch on/off by LDR.

Kaleem[4] proposed that the controller sends appropriate signals to LED lights after receiving signals from sensors. Zigbee module connects the street light control terminal. The data transfer from node to control centre and required command from control centre to node like turning on/off the lights.

Lucky Gangwar[5] proposed that power consumption can be reduced via street light systems using laser source as sensor and Aurdino microcontroller.

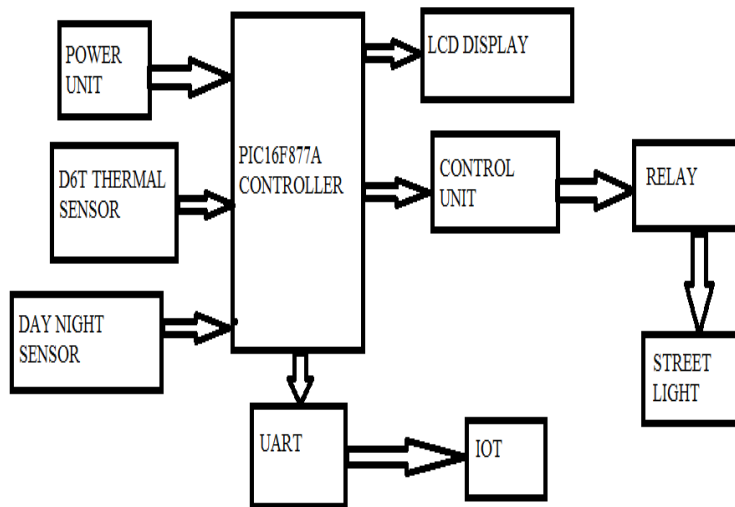
Laser sensors are implanted at a distance away from the streer light systems then glows. Until then, street lights will be in dim/off state.

III. EXISTING BLOCK DIAGRAM



- A. The street lights are automatically switched ON/OFF.
- B. It leads to the rise of time and man power.
- C. Human operation leads to errors.
- D. There is a complaint register in every zonal office street light section.
- E. The maintenance of the street light is done by the line technician.
- F. The complaint received from public and corporation officials either over phone is in person being recorded in the complaint register.
- G. The complaint which is cleared by the line technician.

IV. PROPOSED BLOCK DIAGRAM



- H. The health of the street lamp is monitored by the system .
- I. It increases the life of the street light as well as to reduce the maintenance of the lamp.
- J. The intensity of the lamp should be controlled by using D6T thermal sensors.
- K. Energy conservation will be greater.
- L. Advanced PIC16F877A microcontroller is used to check the consequence of street lamp and informs by sending a message to the tamilnadu electricity board through IOT.
- M. Instead of using piezoelectric sensor, D6T thermal sensor is used to detect the presence of humans and living things.
- N. This system allows a substantial energy savings with increased performance and maintainability.
- O. The manual works will be reduced to a greater extent.

V. HARDWARE / SOFTWARE REQUIREMENTS

- 1) PIC16F877A
- 2) D6T thermal sensor
- 3) Relay
- 4) AC loads
- 5) UART cables
- 6) IOT technology
- 7) MPLAB IDE
- 8) Pickit-3

A. D6T thermal sensor

It is an Extremely sensitive thermal sensor used to detect human presence or movement. The sensor is available with detection zones either 4x4 detection elements wide for standard environment detection or 1x8 detection elements for wide or tall angle detection. the built in circuitry eliminates or limits false triggering caused by outside influences and backgrounds .because the D6T is tuned to recognize the heat signature of human wave length, applications can include stationary or moving human presence detection, power conservation where device power down when no human presence is detected, and security.



B. Pic Controller

It is build up with PIC16F877A microcontroller unit. The input supply can be fed from both ac and dc. Crystal oscillator is used for generating the frequency. A serial communication is achieved by an UART protocol. It is specially designed for connecting digital and analog sensors which has input voltage range 5 or 12V_{DC}. It can be interfaced with the serial communication devices, relay boards etc. The output of the controller can be monitored in the LCD display. Data EEPROM is used to store data defined by the user. It is stored in program memory of which variable is defined and the value is stored in data EEPROM. Communicate with other peripheral devices like serial EEPROMS, A/D converters and shift registers by using synchronous serial ports. They have two modes.

C. They are

- 1) SPI Serial Peripheral Interface
- 2) I2C Inter Integrated Circuit



D. IOT (Internet Of Things)

The Internet Of Things (IOT) is a network of physical devices, vehicles, home appliances and other items embedded with electronics software, sensors, actuators and connectivity which enables these objects to connect and exchange data. Extending the current internet and providing connections, communications and inter-networking between devices and physical objects or “things” is a growing trend that is often referred to as the Internet of Things. The technologies and solutions that enable integration of real world data and service into the current information networking technologies are often described under the umbrella term of the internet of things (IOT). The internet of things has evolved due to a convergence of multiple technologies, including ubiquitous wireless communication, real-time analytics, machine learning, commodity sensors and embedded systems. This means that the traditional fields of embedded systems, wireless sensor networks, control systems, automation and others all contribute to enabling the internet of things.



VI. EXPERIMENTATION PROCESS

The D6T thermal sensor is used to detect the presence of a person or living things. It also operate at low light intensity in the surroundings. It is easy to integrate the devices with analog /mixed-signal processing circuitry on the same IC. The PIC controller plays a major role in this system. Every control circuit contains number of basic components connected together to achieve seek performance. The control circuit having the components of resistors, LEDs, sensors and integrated circuits build in the control circuit. Input supply for the PIC controller fed to both ac and dc. Then the serial communication protocol in PIC controller is achieved by the UART. The IOT technology is used to send the message to the control center or the cloud page. The IOT module having stored datas and any fault occurs in the lamp, it will send a message to the cloud page. The instruction is displayed on the LCD display. This is mainly processed by the PIC controller and thermal sensors. The PIC controller contains the programmable memory and programming instruction. LED array is connected in series and D6T thermal sensors is glowing with full intensity from the timing period of 6pm-11pm, otherwise it will be glowing in a low intensity if there is a absence of person. After 11pm, when there is no person or vehicle in the highways the street light will automatically switched off.

VII. CONCLUSION

An intelligent street light system is designed and easy to monitoring the system using IOT technology. Application of this system is used in corporate fields, parking areas, hospitals, national highways etc. This street light system can be extended easily and adaptable. According to the need of user, it is tractable. Use of IOT technology made the system less complex. Compare with the other systems, this should be more efficient. The D6T thermal sensors is used to reduce the power consumption. Better consonance is reached for intensity regulation. It is one of the economical efficient projects for future implementation.

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