

Smart Street Light System With Fault Detection

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ABSTRACT

The world is moving towards the use of wireless technologies as a communication channel and at the same time facing energy and environmental problems. The Answer to this problem is by combining the power & information technology (IT). Streetlights are one of the city's most important and expensive things usually costs one third of the electricity bill. The proposed Street light system with fault detection surpasses the previous systems because it uses the low power communication protocol ZigBee and LED lights. The system decreases the power of the LED lights according to outside traffic conditions and controls the light intensity as it has the capability to dim the lights. The starting experimental Results shows that it saves notable power as compared to conventional street light systems. This can step up the efficiency by two fold by considering the advantage of remote monitoring and controlling the intensity of lights through the centralize point. Thus the proposed system is the cost effective and efficient system satisfying the needs of the modern users. To design and develop smart grid its need to innovate smart appliances which are more reliable and efficient. To contribute in smart work we are going to design a cost effective solution in distribution transformer, to protect it from thermal overload. In India the maximum distribution transformer is damaged due to overloading, but still there is no any smart protection is applied for

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I. INTRODUCTION

Energy efficiency is the key factor while designing the lighting systems. To use limited power resources efficiently, energy efficient lighting system is necessary which can manage the energy in well informed way. However, the conventional lighting systems are not reliable because of its design is based on the old lighting standards and inefficient instruments and devices. Thus, it results in energy loss, frequent replacement of devices, suffers from the lack of wide spread and effective communications, monitoring automation, and fault detection To address these challenges, many technologies has been used in the literature to save energy such as; the utilization of the light emitting diode (LED) instead of Sodium vapour lamps. But the systems based on these technologies need further improvement to beat the energy issues. To further minimize the energy utilization, various lighting control systems have been proposed to solve that problem such as; occupancy sensing

approach light intensity level tuning Despite of lowering the wiring structure in PLC based designs shown in occasional drops may occur in PLC networks that operates on low power voltage lines. these drops are caused by attenuation and noise, and can last for few tens of minutes. Due to signal carrier attenuation, there may be high latency or communication failure in PLC based design. On the contrary, deploying communication infrastructure based on wireless sensor networks (WSNs), such as ZigBee, eliminates lot of wiring requirement and save lots of energy. To implement wireless control system of lights, several comparable architectures have been applied for indoor lighting and outdoor lighting . The author in Demonstrated controlling of street lighting using ZigBee for short distance communication similar to and extends communication range by using licensed CDMA band for sending information between centralized control center and remote concentrator.

In references and , both authors described preliminary result with common aim to save time for maintenance, reduce energy utilization, and raise reliability. However, these papers statically control the energy consumption and do not consider the user requirements in the terms of light intensity level and the user's presence while dimming or turning off the lamps. By analysing previous researches in the area of lighting control reveals that more exertion has been made either on the lighting control inside building or outdoor lighting control by applying WSN technologies.

However, still there is a demand for an energy efficient system in the market which can be used for both the indoor office environment and outdoor street lights with little modifications. In order to achieve this, we design the energy efficient light monitoring and control system which helps in reducing the energy consumption of the indoor building, and outdoor lighting environment and fulfils the user satisfaction by using illumination sensors, and it Also Includes fault detecting method because it becomes difficult to get an instant notification about errors that occurs in power lines and voltage fluctuations, system uses GSM communication to send a message notification to centralized control centre.

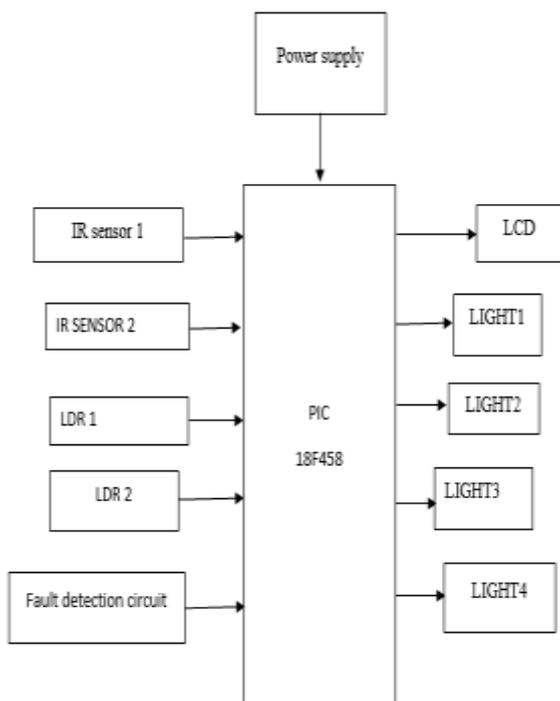


Fig 1. Block diagram

II. WORKING

During the day time the street lights will be completely off. As the Sun sets the light intensity sensed by the LDR sensor and light gets switched ON and intensity of the lights increases gradually. Street lights have the double phase power supply and are driven by the transistors and controlled by using PIC microcontroller.

The Another sensor is used is IR sensor. It is used to detect

the motion of the vehicle passing by. As the vehicle passes the lights get switched on. and if there is no vehicle passing by the road then street lights remains off By this way it saves the energy.

Zigbee module used that shows the monitored voltage and light intensity levels of street lights.

There are 2 kind of applications of this system depending on the area viz. residential area and Road way street light

1) Residential Street lighting:-

For the residential area the System uses LDR sensor, microcontroller and LED light. During the day time the lights remain off as there is no need for the street light. When sun sets and as light intensity reduces, the lights switches on because of this change in intensity is sensed by LDR sensor.

Light intensity of the LED increases gradually as the night falls. In the night the LED will glow bright. It uses PWM technique to control the intensity of the LED light.by this way the light saves energy.

2) Road way:-

In case of road ways, the street light system is configured differently. It uses IR sensor, microcontroller and LED lights. The IR sensors detects the object.

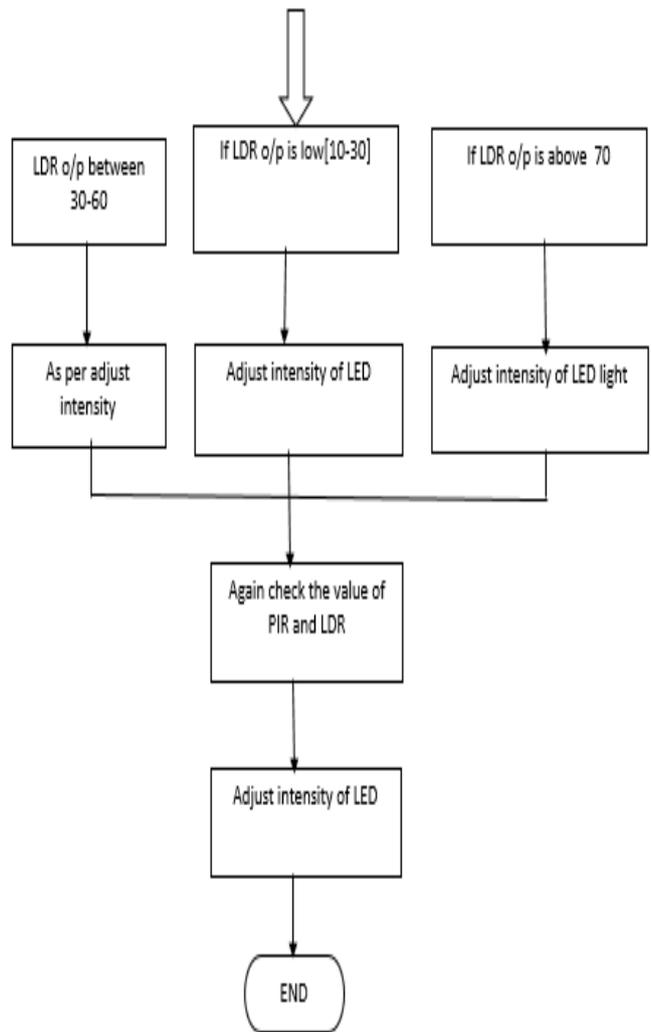
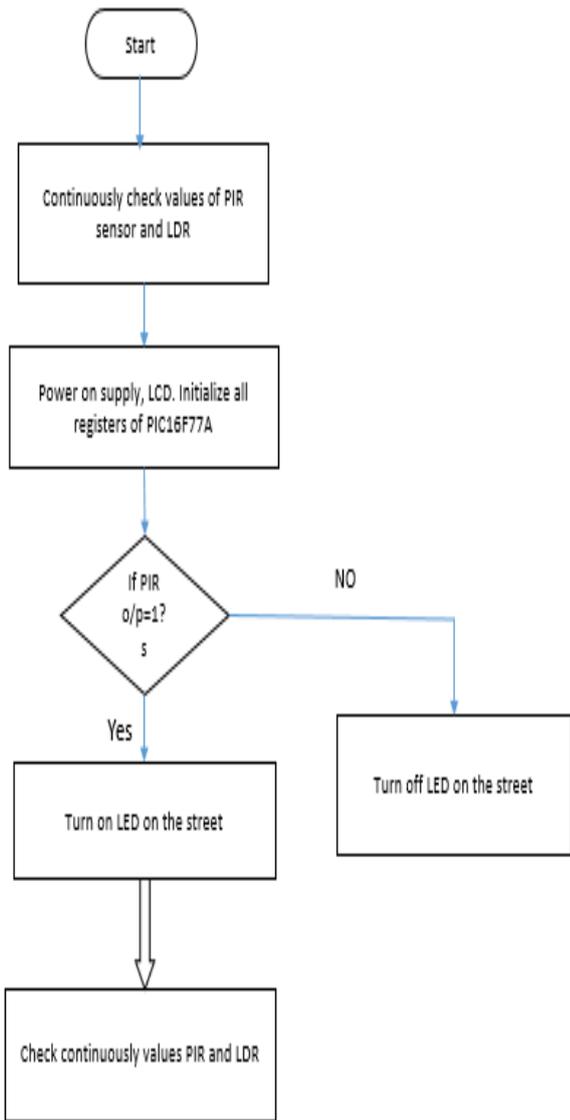
During the day time the lights remains off but when night falls the system starts working. When vehicle passes by the road , the IR sensors sense it and gives the signal to the microcontroller. Microcontroller switches on the street light as long as vehicle takes the time to move. After the vehicle passed, the light gets switched off automatically.

3) Fault detection :-

In case if the fault of the short circuit occurs then there is the technique to detect such a fault. The fault is detected by microcontroller simply by sensing logic 0.

After the microcontroller detects the fault it gives a message through the GSM to the central authority.

III. FLOWCHART



IV. CONCLUSIONS

In most of the countries, mainly the power wastage is occurred due to the street lights and also man power is very less. If every country installed this proposed system, then there will be lot of power can be saved. If there is a fault occurs, then it will detect and gives message to respective authority. helpful to find out the error in power line.

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number	Table Of Conclusion			
	LUX	PWM	mA	T.
1	0-20	250	20mA	28°C
2	20-40	200	25mA	28°C
3	40-60	150	24mA	28°C
4	60-80	100	26mA	28°C
5	80-100	0	21mA	28°C

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