

Iot based Intelligent Street Lighting System Monitoring and Controlling using PIC Micro-controller

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Abstract:-

Computerization assumes an inexorably essential part on the planet economy and in the day by day life. Programmed frameworks are being favored over manual framework. The examination work indicates programmed control of streetlights because of which control is spared to some degree. In the extent of industrialization, robotization is a stage past automation. Though motorization furnished human administrators with apparatus to help the clients with solid prerequisites of work, mechanization enormously diminishes the requirement for human tactile and mental necessities too. Fundamentally, road lighting is one of the essential parts. In this way, the road lights are generally straightforward yet with the advancement of urbanization, the quantity of avenues increments quickly with high activity thickness. There are a few elements should be considered with a specific end goal to outline a decent road lighting framework, for example, evening time security for group individuals and street clients, give open lighting at financially savvy, the lessening of wrongdoing and limiting it is impact on the earth. Toward the starting, road lights were controlled by manual control where a control switch is set in each of the road lights which is known as the original of the first road light. From that point forward, another technique that has been utilized was optical control strategy done utilizing high weight sodium light in their framework.

Key words:-

PIC Microcontroller, GPRS Module, Wireless sensor, IR Sensors, LDR, Supporting Software.

Introduction:

These days, it ended up plainly basic for individuals work amid evenings and returning back to homes late evenings, so wellbeing parameter to be actualized, all things considered, on roadways. This can be best accomplished by actualizing legitimate lighting framework on roadways. The effective checking of this lighting framework must be considered. The current framework resembles, the high way lights will be observed physically which in turns is a misuse of gigantic human power and in addition valuable time what's more with control wastage at the moment when appropriate checking is fizzled.

This disadvantage can be overcome by actualizing a refined programmed checking framework through which high way lighting can be observed naturally before the sun sets and they are turned off the following day morning after there is adequate light on the streets. Be that as it may, the genuine timings for these high route lights to be exchanged on are when there is supreme murkiness. This venture gives the best answer for electrical power wastage assurance.

Existing system:-

The Paper Intelligent Street Lighting System Monitoring and Controlling using PIC Micro-controller is a fascinating undertaking which utilizes PIC16F877A microcontroller as its mind. This venture is extremely valuable for business sign sheets, publicizing sheets, road lights for computerization lighting framework. This framework switches on the lights just in haziness. As it works with LDR sensor, no programming of timings and battery go down is required. This is a basic, fit and overlook framework.

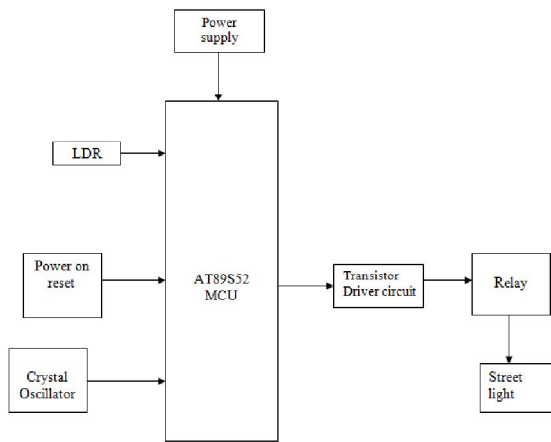


Figure 1. Existing system

Drawback: Road light will be in on condition even without vehicle/individuals.

Proposed Technology:-

Here in this paper, IR sensor and LDR is utilized for the operation of lights naturally, on the off chance that it is day time the light gets OFF this operation can be performed by light sensor (LDR). In the night mode the lights will be on however in the diminish condition. RTC is utilized to control the shine of light around evening time amid the nonattendance of individuals/vehicle. IR sensors are interfaced to the controller which will identify the landing of the vehicle and makes the lights to sparkle splendidly during the evening. This is to spare the power

without the vehicle. Amid day time if there should arise an occurrence of overcast condition the light will shine brilliantly. This is conceivable by checking time with RTC. All the data is accessible in the web server utilizing IoT module associated with the controller. This can be seen either in the PC or in a versatile utilizing web. The microcontroller LPC2148 is utilized as the heart of the venture and every one of the sensors and interfaced to it. This venture utilizes directed 3.3V, 500mA power supply. 7805 three terminal voltage controller is utilized for voltage direction. Extension sort full wave rectifier is utilized to redress the air conditioner yield of auxiliary of 230/12V stage down transformer.

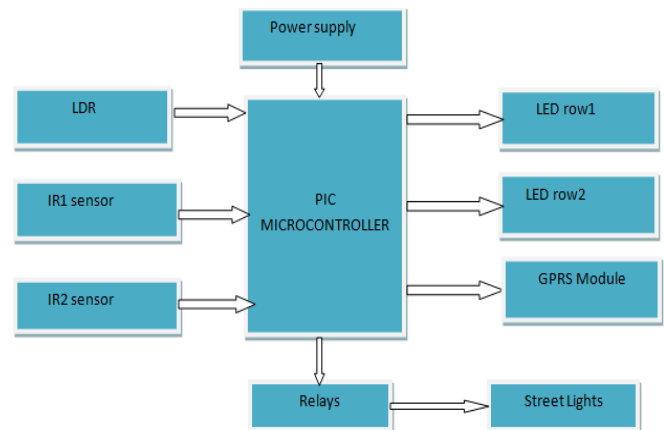


Figure 2. Proposed Technology Block diagram

PIC16F877A MICRO-CONTROLLER

Elite RISC CPU its having 35 single word guidelines to take in ,all directions are single cycle (1µs) aside from program branches and the working rate: DC - 20MHz clock input . Its having 8 k Bytes Flash Program Memory, 368 Byte RAM Data Memory and 256 Byte EEPROM Data Memory. Two 8-bit clock/counter(TMR0, TMR2) with 8-bit programmable prescalar, One 16 bit clock/counter (TMR1).

GPRS

The presentation of second era cell portable frameworks saw a noteworthy development in the quantity of versatile endorsers. The most prominent second era frameworks are GSM and IS-95. The GSM framework depends on FDMA-TDMA innovation and is broadly utilized as a part of Europe, many parts of Asia and Africa. The IS-95 framework depends on CDMA innovation and is utilized as a part of North America. With the expanding notoriety of these frameworks there was an expanding interest for the information benefits over the remote.

LDR

A Light Dependent Resistor (LDR) or a photograph resistor is a gadget whose resistivity is a component of the episode electromagnetic radiation. Henceforth, they are light touchy gadgets. They are likewise called as photograph conductors, photograph conductive cells or basically photocells. They are comprised of semiconductor materials having high resistance. There are a wide range of images used to demonstrate a LDR, a standout amongst the most ordinarily utilized images is appeared in the figure underneath. The bolt shows light falling on it.

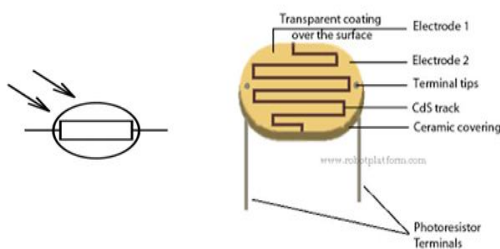


Figure 3. LDR symbol and Working Principle

IR Sensor

An infrared sensor is an electronic gadget that emanates keeping in mind the end goal to detect a few parts of the environment. An IR sensor can gauge the warmth of a question and additionally

recognizes the movement. These sorts of sensors measure just infrared radiation, instead of transmitting it that is called as an inactive IR sensor. More often than not in the infrared range, every one of the items emanate some type of warm radiations. These sorts of radiations are imperceptible to our eyes that can be distinguished by an infrared sensor. The producer is basically an IR LED (Light Emitting Diode) and the identifier is just an IR photodiode which is delicate to IR light of an indistinguishable wavelength from that transmitted by the IR LED. At the point when IR light falls on the photodiode, the resistances and these yield voltages, change in extent to the greatness of the IR light got.

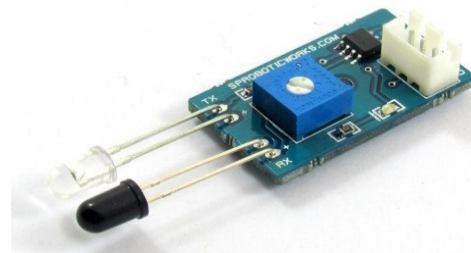


Figure 4. IR sensor

LED

A light emanating diode (LED) is known to be one of the best optoelectronic gadgets out of the parcel. The gadget is fit for radiating a genuinely limit data transfer capacity of noticeable or imperceptible light when its inward diode intersection achieves a forward electric current or voltage. The noticeable lights that a LED radiates are normally orange, red, yellow, or green. The imperceptible light incorporates the infrared light. The greatest favorable position of this gadget is its high energy to light change effectiveness. That is, the effectiveness is very nearly 50 times more noteworthy than basic tungsten light. The reaction time of the LED is likewise known to be quick in the scope of 0.1 microseconds when contrasted and 100 milliseconds for a tungsten light. Because of these focal points, the gadget

wide applications as visual markers and as moving light shows.

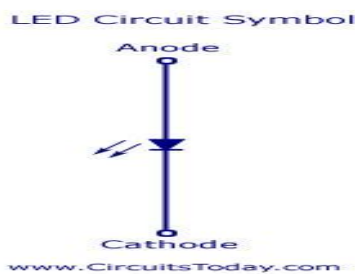


Figure 5. LED Circuit Symbol

Relays

A hand-off is typically an electromechanical gadget that is incited by an electrical current. The present streaming in one circuit causes the opening or shutting of another circuit. Transfers resemble remote control switches and are utilized as a part of numerous applications in light of their relative effortlessness, long life, and demonstrated high dependability. In spite of the fact that transfers are by and large connected with electrical hardware, there are numerous different sorts, for example, pneumatic and water powered. Information might be electrical and yield specifically mechanical, or the other way around. Transfers are primarily made for two fundamental operations.

One is low voltage application and the other is high voltage. For low voltage applications, more inclination will be given to diminish the commotion of the entire circuit. For high voltage applications, they are primarily intended to diminish a wonder called arcing.

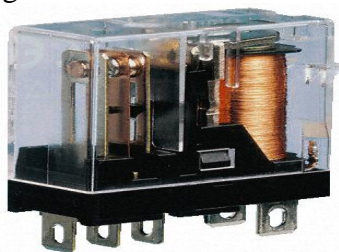


Figure 6. Relay

Software:

The PIC kit 2 Programmer-To-Go usefulness permits a PIC MCU memory picture to be downloaded into the PIC unit 2unit for later programming into a particular PIC MCU. No product or PC is required to program gadgets once the PIC pack 2unit is set up for Programming-To-Go. A USB control hotspot for the PICkit 2 is all that is required.

APPLICATIONS

1. This street light control circuit can be used in normal roads, highways, express ways etc.
2. This project can also be used in parking areas of malls, hotels, industrial lighting, etc.

ADVANTAGES

- ❖ If the lighting system implements all LED lights, the cost of the maintenance can be reduced as the life span and durability of LEDs is higher than Neon based lights which are normally used as street lights.
- ❖ As the lights are automatically turned ON or OFF, huge amount of energy can be saved.

CONCLUSION

This paper elaborates the design and construction of automatic street control system circuit. Circuit works properly to turn street lamp ON/OFF. After designing the circuit which controls the light of the street as illustrated in the previous sections. LDR sensor and the photoelectric sensors are the two main conditions in working the circuit. If the two conditions have been satisfied the circuit will do the desired work according to specific program. Each sensor controls the turning ON or OFF the lighting column. The street light has been successfully controlled by microcontroller. With commands from the controller the

lights will be ON in the places of the movement when it's dark. Furthermore the drawback of the street light system using timer controller has been overcome, where the system depends on photoelectric sensor. Finally this control circuit can be used in long roadways between the cities

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