

Advanced Illumination Measurement System in Highways

¹Banumathi.A, ²Banupriya.A, ³Niranjana.R, ⁴Jayaraman.G, ⁵Dr.N.Muthukumaran

^{1,2}UG Scholar, ^{3,4}Assistant professor, ⁵Professor, ECE Department

^{1,3,4,5}Francis Xavier Engineering College, Tirunelveli-627003.

²Government College of Engineering, Tirunelveli-627003.

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ABSTRACT

Historically, the road lighting system was introduced mainly to avoid crime. Now a day, it plays a vital role in order to avoid accidents, especially during night. It is estimated that the night time accidents are 2.5 times more than day time. Hence, increase in illumination can drastically reduce accidents. In this project, the group of area is monitored whether the illumination is high or low. This illumination measurement is sent to the respective national highway authority via SMS or phone call. In order to maintain the intensity and to avoid dark space the secondary source which is a renewable resource is used. Therefore there will not be any dark space over the highways. This efficiency defines the control of street lighting system and thereby saving electricity which is a major concern worldwide.

Keywords: GSM, LDR, Current Sensor, System.

1. INTRODUCTION

Road lighting system is an important component for safety especially during night. In early days low pressure sodium lamp and high pressure sodium lamp is used for illumination along the roadways and later LEDs for better luminescence. If the light gets fuses or any problem in the power line there exists a dark space in the particular area. In order to avoid such issues there exists Advanced Illumination Measurement System (ALMS) fixed in the vehicle for measuring the illumination and sending it to the highway database. In this paper current sensor is used to sense the current through the circuit, if there is decrease in the amps of the current through the circuit then the signal is send to the authority via SMS with the help of GSM. LDR is used to measure the intensity of the light, if there is decrease in the intensity the value of resistance increases and the secondary source automatically switch on.

2. LITERATURE SURVEY

The work is done on maintaining the illumination along the highway in Order to avoid the accidents. PIC microcontroller 16f877A is used for controlling the system. GSM module is connected to the controller through MAX 232 converter. It is interfaced with the UART (Universal Asynchronous Receiver/Transmitter) of microcontroller. The message is sent to the highway authority via SMS or phone call using GSM if there is decrease in the illumination along the highways. The fluctuations in the illumination may be due to the fused bulb or problem in power line. This is identified with the help of current sensor and LDR, meanwhile the secondary source of light which is a renewable resource (solar panel) is used to avoid the dark zone. Therefore always there is a source of light in the area. Hence accidents may be drastically avoided and the drivers will be safe during the night travel.

3. PROPOSED SYSTEM

It cumulates the dark space over the particular zone of the area sensed by the current sensor. It checks for the amps of the lights if there is any decrease of amps it sends information to the controller. Light dependent resistors is used

to measure the intensities of light whether there is any fluctuation in the brightness of the lights over highways. With enhanced measurement techniques, illumination standards can be met and drivers will be safer at night. It measures the intensities of light whether there is any fluctuation in the brightness of the lights over highways. The information sends to the respective National highways authority via SMS. If there occurs any problem in the power line or else if bulb get fuses, secondary light will glow automatically which is charged by renewable energy of solar source.

The controller is the heart of the system. It receives the sensor Information of current and LDR and gives necessary commands to GSM. The GSM is used to send/ receive messages and make/receive calls just like a mobile phone by using a SIM card by a network provider. . It also gives Commands to change the primary light arrangement to secondary light Arrangement when primary light supposed to be dull or fused.

3.1 BLOCK DIAGRAM DESCRIPTION

The power supply unit consists of step down transformer which step downs 230 v to 12 v and bridge rectifier converts ac into dc supply, filter circuit filters the noise, and voltage regulator gives constant supply to avoid fluctuation. GSM module is connected through MAX 232 converter to the PIC microcontroller. The current sensor senses the current through the circuit and generates a signal proportional to it. Light Dependent resistor is used to determine the intensity of the light in which the resistance value decreases with increase in intensity. Relay acts as a switch for the load. The solar panel capacity is 12 v fixed with the battery. The GSM is connected to the UART port the pic microcontroller for better transmission and receiver. The detection of low illumination causes the secondary source to switch on and with the help of GSM the authorized person will receive the message.

3.2 USED HARDWARE AND SOFTWARE

- a) PIC microcontroller
- b) ADC
- c) Current sensor
- d) GSM, LDR
- e) Max232 Converter
- f) MP lab
- g) PICKIT2 and PROTEUS 8 Professional

3.3 PIC 16F877A MICROCONTROLLER



Fig 2 PIC microcontroller

PIC 16F877A have enough 33 input and output lines for current need. The master controller controls each function of the system with a supporting device. It is also responsible for reception of commands from the host and taking necessary actions.

3.4 GSM



Fig 3 GSM

The GSM is used to send / receive message and make /receive calls just like a mobile phone by using a sim card by a network provide. This GSM modem can work with any GSM network operator sim card just like a mobile phone with its own unique phone number. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data via radio waves.

3.5 LDR

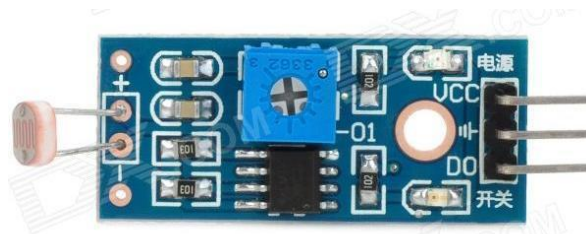


Fig 4 LDR

A photo resistor or light dependent resistor or photo cell is a light controlled variable resistor. The resistance of a photo resistor decreases with increasing incident light intensity and increase with decreasing incident light intensity.

3.6 CURRENT SENSOR



Fig 5 Current sensor

Sensing and controlling current flow is a fundamental requirement in a wide variety of applications including, over-current protection circuits, and battery chargers, switching mode power supplies, digital watt meters, programmable current sources, etc. This ACS721 current module can accurately detect AC or DC current. On board precision micro current transformer, which can transform Ac signals of large current into small amplitude signals.

3.7 SOLAR PANEL

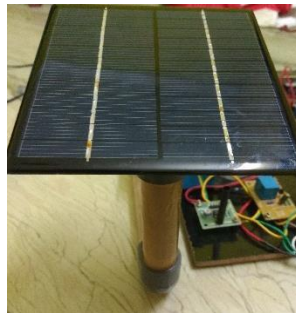


Fig 6 Solar panel

Solar panels absorb the sunlight as a source of energy to generate electricity or heat. The lamp operates on electricity from batteries, charged through the use of solar photovoltaic panel.

4. RESULT AND DISCUSSION

The illumination measurements are met easy with current sensor and light dependent resistor. The current sensor senses the current through the particular area and generates a signal proportional to it. Therefore if there is any decrease in the amps of the current, the intensity of the light will be decreased over the area. This intensity is determined with the LDR in which resistance value increase with decrease in intensity.



Fig 7 Hardware display of advanced illumination measurement system

This information is sent to the authority via SMS or phone call with the help of GSM. Meanwhile the secondary source (solar light) which automatically glows. Hence the dark space over the area is avoided.



Fig 8 Secondary source of illumination

5. CONCLUSION AND FUTURE WORK

The project Advanced Illumination measurement system is designed and implemented. The illumination along the roadway is measured with the help of current sensor and LDR. This data has been sent to the authority via SMS with the help of GSM. The system developed Advanced illumination measurement system in highways, is a method that can be used to measure the luminance. The aim is to improve the luminance along the highways in order to avoid accidents and also theft. In this paper we try to compare the existing methods for ensuring the illumination measurement. With advanced illumination measurement system, the road safety is enhanced and accidents are avoided.

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