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INTELLIGENT VEHICLE TO CONTROL THE ILLUMINATION IN HIGHWAYS TO AVOID ACCIDENTS

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***Abstract*-- The proposed remote-control system can optimize management and efficiency of street lighting systems. It uses Zigbee based wireless devices which enable more efficient streetlamp-system management, thanks to an advanced interface and control architecture. It uses a sensor combination to control and guarantee the desired system parameters; the information is transferred point by point using Zigbee transmitters and receivers and is sent to a control terminal used to check the state of the street lamps and to take appropriate measures in case of failure or low illumination this will helps to provide good light illumination in highways for drivers and hence accidents are avoided.**

Index Terms-- *Zigbee Module, Light Sensor, IR Sensors, GPS Module*.

I. INTRODUCTION

LIGHTING systems, especially in the public sector, are still designed according to the old standards of reliability and they often do not take advantage of the latest technological developments. In many cases, this is related to the plant administrators who have not completed the return of the expenses derived from the construction of existing facilities yet. However, the recent increasing pressure related to the raw material costs and the greater social sensitivity to environmental issues are leading manufacturers to develop new techniques and technologies which allow significant cost savings and a greater respect for the environment. We can find three possible solutions to these problems in the literature.

The first one, and perhaps the most intuitive, is the use of new technologies for the sources of light. In this area, light-emitting diode (LED) technology is the best solution because it offers many benefits. Researchers have already considered this possibility, designing an advanced street lighting system based on LEDs. The second possible solution, and perhaps the most revolutionary, is the use of a remote-control system based on intelligent lamp posts that send information to a central control system, thus simplifying management and maintenance issues. Researchers have developed a street lamp system using global positioning system(GPS).

II. DESIGN OF HARDWARE

MICROCONTROLLER: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

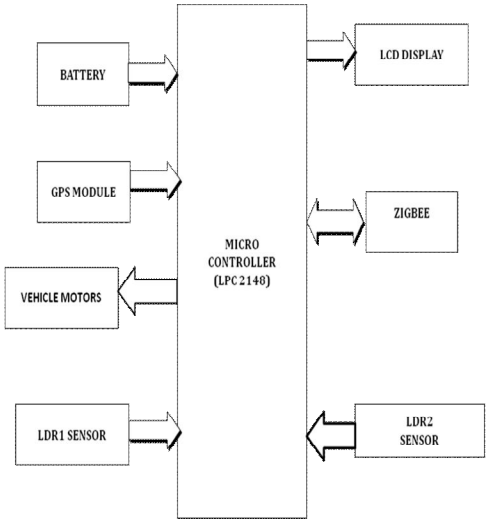
ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

LIQUID CRYSTAL DISPLAY: LCD is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs display arbitrary images or fixed images which can be displayed or hidden.

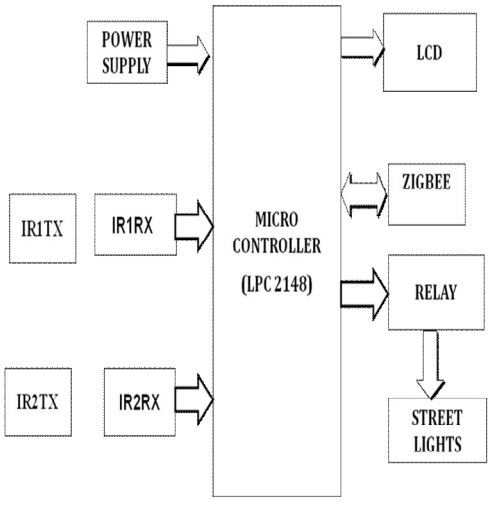
ZIGBEE: Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this ase is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The below table gives the pin description of transceiver.

Design of Proposed Hardware System

VEHICLE SECTION:



MONITORING SECTION:



The low illumination on highways may cause to accidents and its not easy to monitor the each and every zone in road so vehicle with light sensors is been sent and will monitor the light intensity and problem with the illumination is controlled automatically by vehicle along with illumination measurement and controlling the speed of vehicles travelling in that specific zone is also noted just for observation purpose and to know the location accurately the vehicle is build with GPS such that it will track the location of the zone from where the readings have been taken,

Board Hardware Resources Features

ZIGBEE:

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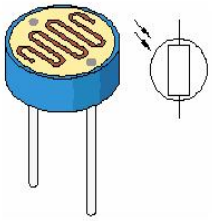
- Minimum connections: VCC, GND, DOUT & DIN
- Minimum connections for updating firmware: VCC, GND, DIN, DOUT, RTS and DTR
- Signal Direction is specified with respect to the module
- Module includes a 50kΩ pull-up resistor attached to RESET
- Several of the input pull-ups can be configured using the PR command
- Unused pins should be left disconnected

Data is presented to the X-Bee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the

input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART. Just in case you are producing data faster than the X-Bee can process and transmit it, both X-Bee modules incorporate a clear-to-send (CTS) function to throttle the data being presented to the X-Bee module's DIN pin. You can eliminate the need for the CTS signal by sending small data packets at slower data rates.

Light Dependent Resistor:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1,000,000 ohms, but when they are illuminated with light, the resistance drops dramatically. Thus in this project, LDR plays an important role in switching on the lights based on the intensity of light i.e., if the intensity of light is more (during daytime) the lights will be in off condition. And if the intensity of light is less (during nights), the lights will be switched on.



IR SENSOR:

Here the IR transmitter is nothing but the IR LED. It just looks like a normal LED but transmits the IR signals.Since the IR rays are out of the visible range we cannot observe the rays from the transmitter. These are infrared LEDs; the light output is not visible by our eyes. They can be used as replacement LEDs for remote controls, night vision for camcorders, invisible beam sensors, etc

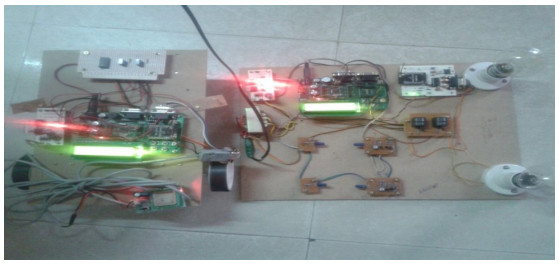
III. IMPLEMENTATION DETAILS

This project is designed around a microcontroller LPC2148 which forms the heart of the project. It use two sensors such as LDR Sensor, IR Sensor. These sensors are interfaced to the microcontroller. These sensors are used to detect the light intensity. The LDR sensors in vehicles helps in light intensity measurement and if low light is found in zone then the lamp illumination is controlled automatically.

These sensor reading are displayed on LCD display. Into the particular zone its speed is predicted with the help Robot is used to monitor the light conditions in different areas. When a vehicle enters timers concept. The inbuilt GPS vehicle in car is used to detect the locations.

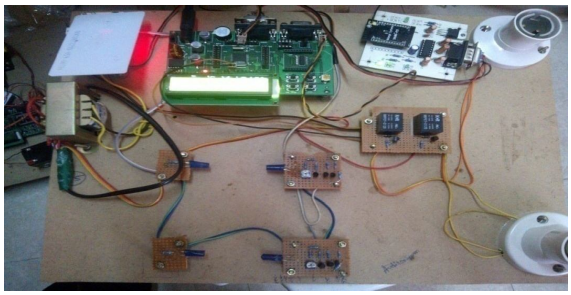
IV. RESULTS

The proposed system was designed and validation tests were performed to ensure it is a viable solution to measuring roadway illumination while travelling. The proposed system was put through two sections,by using these two sections to control the illumination for street lights. The below figure shows two sections of proposed system



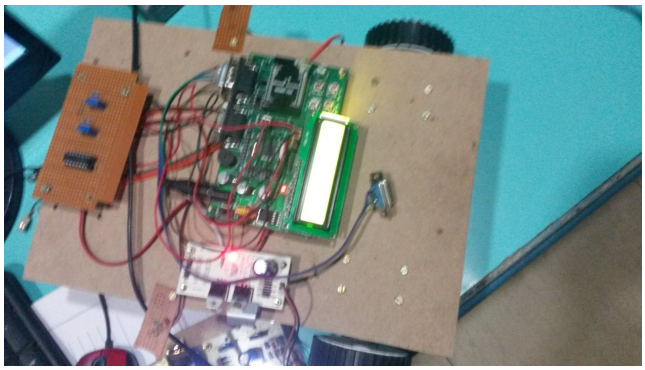
Experimental Setup

The below figure shows monitoring section,this section monitoring the details of vehicle section.



Monitoring Section

The below figure shows vehicle section in this section describes the controlling illumination and vehicle location.



Vehicle Section

The below figure shows Displaying LDR Values section.

Controling Illumination

V. CONCLUSION

This paper describes a new intelligent highway lighting illumination system which integrates new technologies available on the market to Offer higher efficiency and considerable savings. This can be achieved using the highly efficient LED technology supplied by renewable energy of solar panels, for which the cost of energy is independent from the power supplier prices, combined to an intelligent management of the lamp posts derived by a control system switching on the light only when necessary, and controlling the illumination to avoid accidents and providing proper vicinity for drivers. Another advantage obtained by the control system is the intelligent management of the lamp posts by sending data to a central station by Zigbee wireless communication. The system maintenance can be easily and efficiently planned from the central station, allowing additional savings. The proposed system is particularly suitable for street lighting in urban and rural areas where the traffic is low at a given range of time. The independent nature of the power-supply network enables implementing the system in remote areas where the classical installations are prohibitively expensive. The system is always flexible, extendable, and fully adaptable to user needs.

The simplicity of ZigBee, the reliability of electronic components, the feature of the sensor network, the processing speed, the reduced costs, and the ease of installation are the features that characterize the proposed system, which presents itself as an interesting engineering and commercial solution as the comparison with other technologies demonstrated. The system can be adopted in the future for loads supplied by the power system, which enables the monitoring of energy consumption. This situation is particularly interesting in the case of economic incentives offered to clients that enable remote control of their loads and can be useful, for example, to prevent the system blackout. Moreover, new perspectives arise in billing and in the intelligent management of remotely controlled loads and for smart grid and smart metering applications.

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