IJREAT International Journal of Research in Engineering & Advanced Technology, Volume 3, Issue 1, Feb-Mar, 2015
ISSN: 2320 – 8791 (Impact Factor: 1.479)
www.ijreat.org

Intelligent Traffic Light And Automatic Street Lighting System According To Traffic Density

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Abstract

In this paper the new innovative traffic light system as well as street light system with optimised street light and traffic light management is introduced. It uses many sensors to control and improve the efficiency of the system. LDR detect the darkness then street lamp will switching ON with full intensity. At midnight intensity of street light decreased to half of its intensity. Presence of vehicle or person is detected by using the presence detector (IR sensor) as obstacle detected street light glows with full intensity for some time. The second part of this system is to control the traffic jams. The RFID tags are used for detection of emergency vehicle. This system assign the priority to each lane depending upon number of vehicle. Green light will gives for the lane having 1st priority and more time than other lane .This system saves more power and provide safety on the road.
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Keywords: *LCD display , LDR, LED lamp, IR sensor, PC with camera, RFID tag.*

1. Introduction

Traffic research has the goal to control traffic flow of people and goods. As the number of vehicle constantly increases, and resources provided by current infrastructures are limited, intelligent control of traffic will become a very important issue in the future. But it has some limitations to the usage of intelligent traffic control exist. Avoiding traffic jams is beneficial to both environment and economy. In our project we focus on controlling of traffic light controller in a city using IR sensor and RFID Tag and HD cameras. Control Traffic is a complex problem. Even for single junctions it is not easy to control traffic. With multiple junctions, the problem becomes even more complex. Main complication is flow of traffic constantly changes, depending on the time of day, the day of the week, and the time of year. Road worker and accidents increases the complexity further. This paper is propose to automation cost effectiveness and reduce energy consumption , rapid growth of industry and cities increases the complexity of traffic control. To control and maintain complex street lighting system more economically, various street light control systems are developed. They may include transmission and reception of signal via separate networks, at high frequency band or using wireless technology. Various protocols have been developed as well as compatible hardware for most types of lighting. A multi-functional street light control system, which is more electricity conserving and convenient, is presented here in this paper. Main goal of the proposed work is to control switching of street light automatically according to traffic. This proposed system use LED Lamps instead of generally used street lamps such as HID lamps. The LED technology has several advantages over other traditional technologies like energy saving due to high current luminous efficiency, low maintenance cost, high color rendering index, rapid startup speed, long working life etc.
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2. Problem Definition

This paper is designed for reducing the traffic jams and human death due to heavy traffic and also energy consumption is to be reduced by using LED lamp.

3. Important Components Of The Tystem

There are some components are used in this system like ARM 7 LPC 2138,RFID tag,IR sensor,LDR

3.1 ARM 7 LPC 2138

The LPC2138 microcontrollers are based on a 32/16 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, that combines the microcontroller with 32 kB, 64 kB and 512 kB of embedded high speed Flash memory. A 128- bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at maximum clock rate. Various 32-bit timers, single or dual 10-bit 8 channel ADC(s), 10-bit DAC, PWM channels and 47 GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers particularly suitable for industrial control and medical systems.

3.2 IR SENSOR

IR sensor is used for detection of vehicle. The IR Sensor-Single is a general purpose proximity sensor. Here we use it for collision detection. The module consist of a IR emitter and IR receiver pair. The high precision IR receiver always detects IR signal. The module consists of 358 comparator IC. The output of sensor is high whenever it IR frequency and low otherwise. The on-board LED indicator helps user to check status of the sensor without using any additional hardware. The power consumption of this module is low. It gives a digital output.

3.3 RFID TAG

The rfid reader is used as the unique id of the vehical which will help us to detect the ambulance .The RFIDREAD-µRW is designed to read and write the popular range of EM4100 , T5557/67/xx, and EM4205 / EM4305 transponders available on the general market.In addition it can perform read functions on transponders programmed using FDX-B protocol for animal identification as described in ISO11784/11785 standards. It is also capable of programming T55xx and EM4205 / EM4305 transponders in FDX-B protocol standard. In operation the reader will continually scan for either EM4100, T55xx, FDX-B, or EM4205/EM4305 transponders depending on which type has been selected. The transponder type can be selected by way of pre-defined commands via the Uart Receive line. When the selected transponder is in range it is read and its associated data is transmitted on the Uart Tx line in serial ASCII format.

3.4 LDR

The theoretical concept of the light sensor lies behind, which is used in this circuit as a darkness detector. The LDR is a resistor and its resistance varies according to the amount of light falling on its surface. When the LDR detect light its resistance will get decreased, thus if it detects darkness its resistance will increase. Light Dependent Resistors have a particular property in that they remember the lighting conditions in which they have been stored. this memory effect can be minimised by storing the LDRs in light prior to use. Light storage reduces equilibrium time to reach steady resistance values.

4. Hardware Implimentation Of System

There are two parts of the system part 1 and part 2.

In Part 1 The fig.1 shows block diagram of street light control system.

In Part 2 The fig.2 shows the block diagram of traffic light control system.

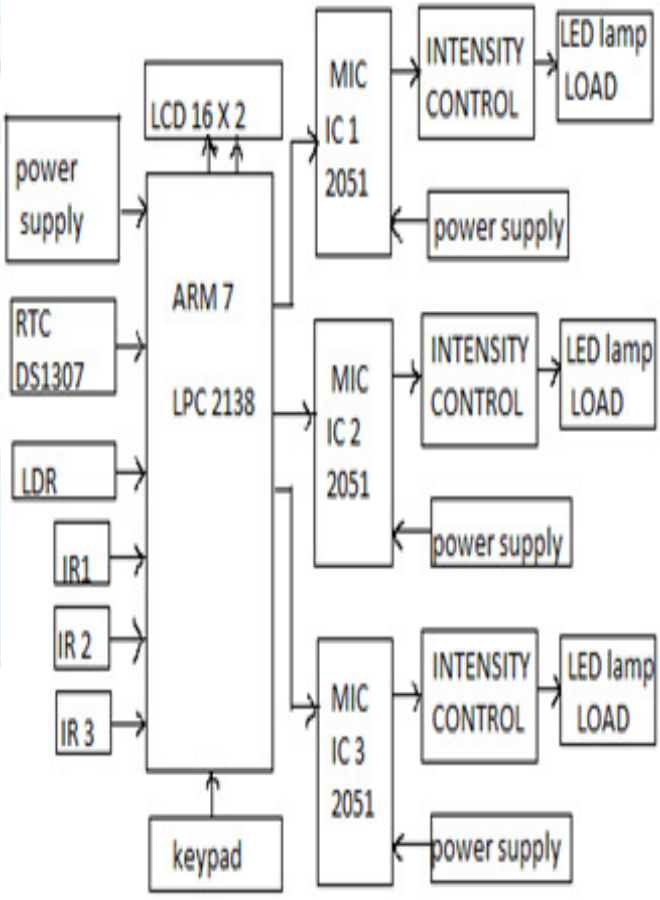

FIG.1 BLOCK DIAGRAM OF PART 1

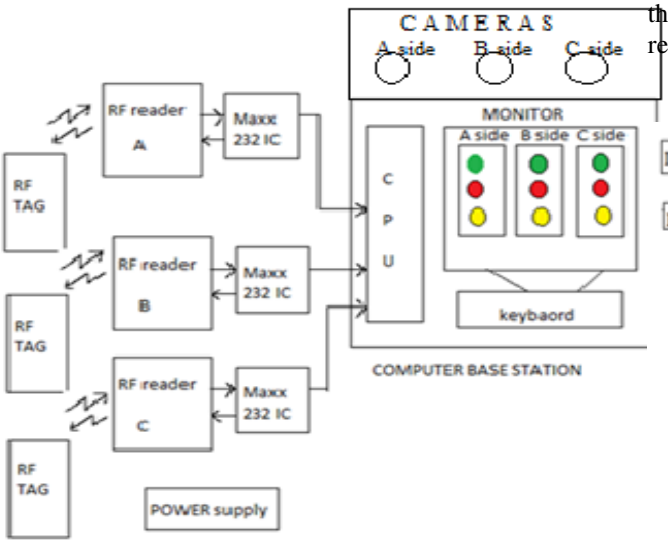

FIG.2 BLOCK DIAGRAM OF PART 2

the Emergency vehicle. Camera gives the real time video recording of traffic at the junction point.

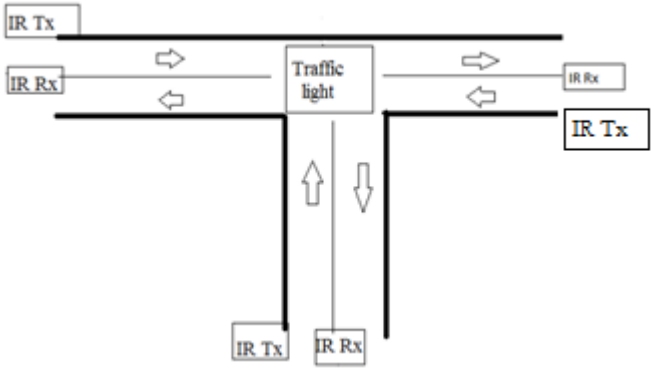

FIG.3 GENERAL LAYOUT OF LANES

5. Working Of System

This system works in two parts which are following

5.1.Working Of Street Light

In this part the street light is controlled by different sensors such as IR sensors and LDR . First the LDR will scanned the darkness then the signal will be sent to the ARM 7 then Street light will be switced ON with full intensity up to midnight. At the midnight intensity of the street light will be decreased to the 50%. IR sensors are placed on road side at a particular distance. If vehicle detect by IR sensor then Intensity of Street light will be increased to the 100 % after passing vehicle intensity of street light decreased to the 50% . When sun light falls on LDR it will switced OFF the street light.

5.2 .Working Of Traffic Light

In this system traffic light is controlled with the help of RFID reader and IR sensors.IR sensors and RFID reader placed on road side. Consider the junction point of three lane IR sensor will count the number of vehicle on each lane. Information send to the control room then priority will be assigned to the lane as per the number of vehicle . 1st priority is assigned to that lane having more number of vehicles and traffic light gives GREEN signal for that lane for 1.10 minute. Other lane will get 55 second each as per the priority. But in case of RFID reader detects EMERGENCY vehicle then the 1st priority will be gives to

6. Methodology Of Implementation

6.1. Algorithm For Street Light

1. Start
2. Initialize all ports
3. Sense the darkness , if no goes to step 3
4. Switching ON the street light
5. Intensity decreased to half at mid night
6. Vehicle detect intensity increased to 100%
7. Sense the light, if yes go to step 8 otherwise go to step 6
8. switching OFF street light
9. End

6.2. Algorithm For Traffic Light

1. Start
2. Initialize all ports
3. Count the number of vehicle on each lane
4. If Emergency vehicle detect go to step 5, otherwise go to step
5. Green light gives for Emergency vehicle lane
6. Assign the priority as per number of vehicle
7. Green light gives for highly dense lane
8. End

7. CONCLUSION

This paper introduced a low cost, low-power embedded system for automatic street lightning and traffic

control system . In this paper, we discuss the design of proposed control the traffic and street light , Using ARM LPC 2138 Microcontroller and RFID technology . In foreign countries this technologies widely used for traffic and street light management . But in India we have not implemented any automated system for street and traffic light management. By implementing these features in real time application we can avoid accidents up to approximately 50% and We can reduce the power consumption up to 50-60%.

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