ARDUINO BASED SMART ROADS CONTROLLING SYSTEM FOR FUTURE CITIES

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ABSTRACT

The main objective of this paper is to control the traffic lights based on density of the vehicles and turn on street lights in night times. In this system IR sensors are used to measure the density of the vehicles which are fixed within a fixed distance. All the sensors are interfaced with the Arduino which in turn controls the traffic signal system according to density detected by the sensors. If the system traffic density is high on particular side more priority is given for that side. The sensors continuously keep sensing density on all sides and the green signal is given to the side on priority basis, where the sensors detect high density. The side with next priority level follows the first priority level.

The system is also provided with LDR which is used to turn ON streetlights only in night time and also whenever a vehicle comes. The detection of vehicles is also identified using LDR in the proposed system. By using this system traffic can be cleared without irregularities, time delays and power can be reduced.

Keywords: Arduino Uno, AtMega328 microcontroller, Infrared sensors ,LDR (Light Dependent Resistor),LED(Light Emitting Diode).

I.INTRODUCTION

Most of the controlling systems, today, are embedded systems. A combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a dedicated function. Embedded systems are designed to do some specific task. Some also have real time performance constraints that must be met, for reason such as safety and usability; other may have low or no performance requirements, allowing the system hardware to be simplified to reduce cost. The software written for embedded systems is often called firmware, and is stored in read-only memory or flash memory chips rather than a disk drive. It often runs with limited computer hardware resources: small or no keyboard, screen, and little memory.

II.PROBLEM DEFINITION

In traffic junction, we can see red, orange and green lights along with the displaying timer. The traffic as to wait for a fixed period of time to make a move. For example, one as to wait for a fixed period of time even though the traffic is more in that particular lane. This leads to "TRAFFIC JAM" which is a major problem . .Along with,this paper deals another problem that our country facing is "SCARCE OF ELECTRICITY". Street lights are always switched ON at midnights. For example, even if there are no vehicles moving at midnight, street

lights are glowing which is not actually necessary. Improper utilization of street light, electricity is used unnecessarily which is a "NATIONAL WASTE".

III.EXISTING METHOD

In existing method, Conventional traffic light system is based on fixed time concept allotted to each side of the junction which cannot be varied as per varying traffic density .For example when there is a huge traffic on the one side of the traffic signal, it should be cleared as soon as possible. But in our existing traffic system, one should has wait until their turn comes even if there is a heavy traffic in that particular lane.

IV.PROPOSED METHOD

In proposed system,when there is a huge traffic on the one side of the traffic signal, it should be cleared as soon as possible. But in our existing traffic system, one should wait until their turn comes even if there is a heavy traffic in that particular lane. Toavoid this we can provide a sensor which is capable of analyzing the traffic intensity. This can be used to clear the traffic as soon as possible before causing a traffic jam. In this system, sensors are used to prevent loss of energy by the unnecessary usage of street lights at midnight. At nights street lights are switched ON even if there are no travelling vehicles. So, in order to overcome this, sensors are used for street lights and when a vehicle pass through the sensors, the street light is switched 'ON' and when the vehicle passes the particular street light, the next street light will be switched 'ON' automatically and the previous lights are switched 'OFF'. This is continued throughout the street thereby saving the energy.
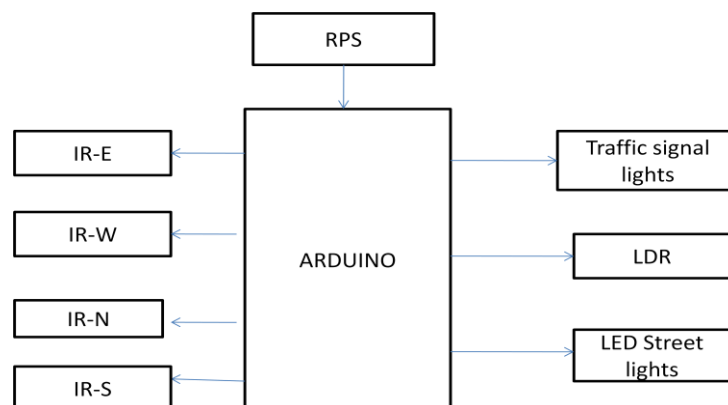
Fig; Block diagram of smart roads by using Arduino

V. COMPONENTS DESCRIPTIONS

1. ATmega328 controller

2. IR sensors -4

3. LDR sensor

4. LED's

1. Atmega328 Controller

Atmega328 microcontroller was proposed by Atmel. Its operating frequency is 20MHz.The number of channels is 16.The device operates between 1.8-5.5 volts.

2. Infrared Sensors

In this we are using infrared sensors namely infrared transmitter and infrared receiver .the IR transmitter sends light ray to IR receivers. If there is any obstacles occurring between these two then the data signal is   send to microcontroller and its act upon a signal.

3. Light Dependent Resistor

LDR (Light Dependent Resistor) is a device whose resistivity is a function of the incident magnetic radiation. They are light sensitive devices. They are made up of semi conductor materials having high resistance.
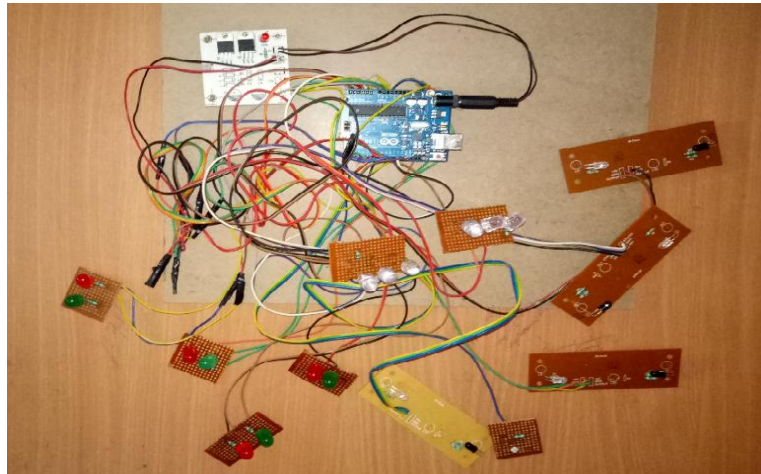
4. Light Emitting Diodes

 LED's are used for traffic signal indicating lights and street lights. Here traffic lights are Operate according to the Microcontroller signals.

VI. SCHEMATIC DIAGRAM

Out
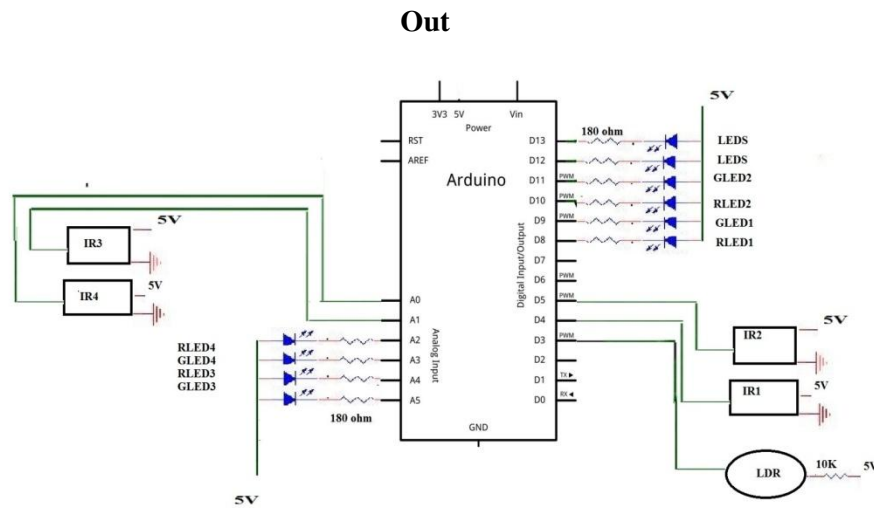
VII.RESULTS

VIII.CONCLUSION

We conclude that, this system is used to prevent the loss of energy. We can reduce the traffic intensity. We can reduce fuel wastageMaximum energy can be saved.We can save considerable amount of time.We can avoid unnecessary occurrence of traffic jams which causes public inconvenience. This paper is mainly used to control the traffic in metropolitan cities. There is no need of traffic inspector at the junctions for supervising the traffic to run smoothly .

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