

Intelligent Traffic Management System using Bollards

L.K.Hema, Gopalakrishnan. B, Pooja Lall, Gokula Prasath R.B



Abstract: Nowadays traffic in metropolitan cities is becoming a challenging task and the violation of traffic rules leads to fatal accidents. The commuters are also facing lot of delay in their destination when they caught up in traffic which makes them unstable in their working environments. The proposed bollards based intelligent traffic management system determines the traffic scenario using sensors deployed in various locations and thereby regulating the traffic thereby providing chaos free travel. The installation of the bollard system, including traffic lights and communication pillars, is one among the intelligent traffic management system. This system is working in combination with the traffic light control, bollards to regulate the traffic. This system can be used in restricted areas, crowded malls, public access locations, and tourist locations also to regulate the traffic and movement of the people.

Keywords: Bollards, Traffic Management, Arduino, RFID

I. INTRODUCTION

The first traffic light system was installed at London's House of Commons in the year 1868 in the cross roads of Martyr and Bridge street. The next generation of traffic lights were developed in the year 1914 by associate degree Yankee traffic light company which are controlled in temporal manner and if necessary manually too. The traffic lights are also called as stoplights, road traffics lamps, traffic signals and stop and go lighting system. These systems are placed in crowded city area.

Usually traffic lights encompass 3 styles of coloured lights like red, amber and green. In a very typical cycle, turning on of inexperienced light-weight permits traffic to continue within the manner indicated. Similarly, the illumination duration of amber light helps the vehicle to be ready to ply, the red light disallows the vehicle and green lights indicates the vehicle to move on.

Bollards may be a short post accustomed produce a protecting or subject perimeter. Once put in primarily as a visible guide, bollards guide traffic and mark boundaries. They are available in a very big variety of shapes and designs to intensify or visually stand get in their setting. Bollards also can be created to physically block vehicle incursion, protecting individuals and property.

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These security bollards might have ornamental component or be chosen to enrich the landscape, however their primary thought is resistance to impact force.

Bollards is made of any material, looking on their required operate, however the foremost common bollards area unit metal, stone, cement, or plastic.

The prime objective of this paper is to facilitate intelligent traffic management system to control and coordinate the traffic and pedestrian movement in a smooth and safer manner. In addition, to build a fully automated system that monitors and controls the road traffic and thereby reducing traffic, in turn probability of accidents on roads can be reduced drastically. The overall mission of system development is to keep the road traffic in control.

II. SYSTEM DESCRIPTION

In this paper, Bollard based Traffic control system Prototype is used. Here bollards are used to protect sites or divert traffic. They are also used for controlling of pedestrian movement at the entry and exit points and also regulates the vehicles passing by thereby ensuring safety to all. In India, where population rises with very high rate and no control on traffic bollards are one of the only choices for pedestrian friendly protection from vehicle attack. These bollards increase driver awareness as well as providing physical barrier protecting both people and property.

III. SCOPE OF THE SYSTEM

This paper starts with exploring the methods in which control traffic can be managed and controlled in thickly populated dense vehicular movement by deploying simple yet effective measures to help segregate authorized vehicles from general traffic; thus affording greater road safety for pedestrians and vehicles. While proposing a traffic management system, the authorities should consider the following for the protection of public and property. If and what access management measures may be accustomed manage areas at intervals town centres desirous to prohibit bound vehicles like bus lanes or pedestrian solely areas.

IV. PROPOSED SYSTEM

This paper proposes a system that makes use of red, amber and green LED lights to indicate the vehicle stop, ready and ply status. Arduino controller is used for manipulation of signal lights at specified range of time interval. The 3 different LED lights are sequentially operated with proper time interval automatically by enabling the appropriate port pin of the Arduino controller "HIGH". And the bollards goes up and down with it. As the red light is indicated, bollards with go above the road, and when the green light is indicated these bollards will go down the road and allows the vehicles to pass.

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The switching of traffic lights, LED glowing duration can be set through programming as per our requirements. The changeover of lights from red, amber and green is happening periodically and in synchronization with this the bollards will be actuated.

V. HARDWARE DESCRIPTION

The block diagram of the system proposed comprises of the following

- Arduino Controller
- Bollards
- Traffic light LED
- Driver circuit
- Switch
- Power source
- RFID tag
- RFID reader
- Wifi interface
- USB to serial converter
- Storage device

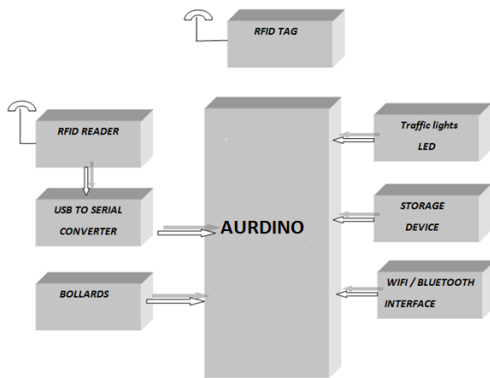


Fig 1. Block diagram of the system

In our system we have used Arduino UNO open-source microcontroller board from Microchip ATmega328P. The board is having set of digital and analog I/O pins which may be interfaced various I/O devices for input, actuation and controlling purposes. The board will be powered by 12 V battery.

Bollard is a firm, short, vertical pillar. The term is originally derived from a post/pillar which is to mooring boats.

There are many types of bollards namely,

1. Traffic bollards
2. Illuminated bollards
3. Bell bollards
4. Removable bollards, etc.

The driver circuit is used to actuate the bollards. Normal DC gear-head motors requires current greater than 250mA. ICs like 555 timer, ATmega16 Microcontroller, 74 series ICs cannot supply this amount of current. So to bridge the controller circuit and motors we have proposed 3 methods of using Transistor or by using L293D/L298 or relays.

TRAFFIC LIGHT CONTROL

In the proposed system the traffic light signals are represented using LED's. The LED driver circuit will be chosen according to the type of power source (AC/DC). This traffic light signal is equipped with a RS-485 port/Wireless module which is normally controlled by microcontroller to interact with control station. The power

source for the prototype developed is through batteries of 12V. The RFID Tag & RFID module is used to read the vehicle's detail and register the information about the vehicles crossing the bollards located region. The Wi-Fi is used for communication to actuate the bollards depending on the traffic signal light. Especially we proposed the RFID module to identify the critical care vehicles like ambulance, milk van & medicine carrying vehicles and VIP vehicles.

Fig 2 depicts the hardware module developed and Fig 3. Shows the activation of bollard system based on traffic signal light.

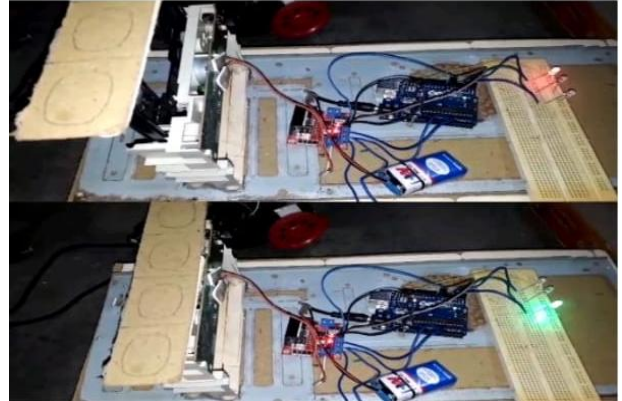


Fig 2. Experimental set up



Fig 3. Output screenshot

VI. CONCLUSION

The design and prototype of Intelligent Traffic Management Using Bollards System has been executed with the appropriate module. The current system is an automated one synchronized with traffic light, we realize that the system we are going to build must give the solutions for increased road accidents. We have developed the prototype of intelligent traffic management system using bollards and the system is developed in lucid and working effectively.

RFID system can be imposed on this current system for allowing the ambulance to pass through the traffic signal. RFID tag will be placed below the ambulance and reader will be placed under the road, so that the tag can be read and the bollards near to that location will be downed automatically, so that the ambulance can pass without much delay.

A bollard designed with hydraulic accumulator system assures protection to pedestrian and infrastructures. LDR setup can be imposed for avoiding the bollards to come above the road, if any vehicle is standing above the bollards system. To save the power consumed we can deploy IR sensor module which senses the traffic density during non-peak hours and accordingly the traffic and bollards systems shall function.

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