# SMART TRAFFIC MANAGEMENT SYSTEM

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*Abstract:* Traffic management system is considered as one of the major dimensions of a smart city with the rapid growth of population and urban mobility in metropolitan cities, traffic congestion is often run on roads. To tackle various issues for managing traffic on roads and to help authorities in proper planning, a smart traffic management system using the IOT. A hybrid approach is used to optimize traffic flow on roads and algorithm is deviced to manage various traffic situations efficiently. For this purpose we manage the traffic signals according to the density of traffic on roads. According to the traffic signals in order to control traffic on roads we are implementing tollgates. The signals are managed by using the IR sensors. We use solar panels for continuous power supply. In case an emergency vehicle present in the traffic where the gate is closed this can be managed by using blynk software application. This will be installed in the emergency vehicle and operated by the vehicle driver.

*Index Terms -* Heavy traffic, Emergency vehicle detection, IR sensors, Toll gates.

## I. INTRODUCTION

The transportation system is important in every one's life. Traffic congestion is a major issue in our daily life. There are several reasons for the sudden surge in the traffic, in many regions. The main reason can be defined as, to increase in the population which in turn has caused a rise in the number of vehicles on the road. Also,there are several other issues for the traffic congestion like insufficient infrastructure, ineffective management of emergencies, unconstraint demands etc, in the past few years, development in wireless communication technologies and development of vehicular network standard tiled the way for the implementation of intelligent traffic management system. Intelligent traffic management is defined as the application of advanced sensor, computer, electronics and telecommunications technologies and management strategies in an integrated way to improve the safety and efficiency of transportation system.

## II. EXISTING SYSTEM

In the present day scenario the traffic on roads is controlled manually by the traffic police. The traffic signals are operated according to the number of lanes present one after the other either in circular form or opposite form. In the existing system whenever the traffic signal is red the vehicles which are present need to wait till the signal turns green. But many people do not follow the traffic rules and cross the signals. This is the drawback of this system so we are implementing new system inorder to control the volition of traffic rules.

## III. PROPOSED SYSTEM:

Everyday traffic congestion bigger issues are a daily basics. So automation systems are currently not available in india we need of IOT to utilize in traffic signal monitoring systems and to control it in an advanced controlling system.. Every road towards heavy traffic of vehicles in higher counts. We need to define the priority level the traffic in our project on the basis on which least or higher priority. Traffic management system key appliances to control over traffic as per population of vehicle ID that particular area. So every road lane needs IR sensors to monitor and capture the data of vehicle density in the lane. In this proposed system depends on the density of vehicles from the road lane IR data we are allocating higher time rate from the signal.

## IV. REQUIREMENTS:

### 4.1: Hardware Requirements:

#### 4.1.1: Aurdino Board:

Arduino is a single board microcontroller, intended to make the application of interactive objects or environments more accessible. The hardware consists of an open source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. Pre-programmed into the on-board microcontroller chip is a boot-loader that allows uploading programs into the microcontroller memory without needing a chip /device programmer. Arduino started in 2005 as a project for students at the Interaction Design Institute Ivreain Italy. The core Arduino developer team is composed of Massimo Banzi, David Cuartielles, and David Mellis. Arduino family consists of UNO, LILYPAD, DIECIMILA, NANO, and DUEMILANOVE. An Arduino board consists of an Atmel 8-bit microcontroller with complementary components to facilitate programming and incorporation into other circuits. Official
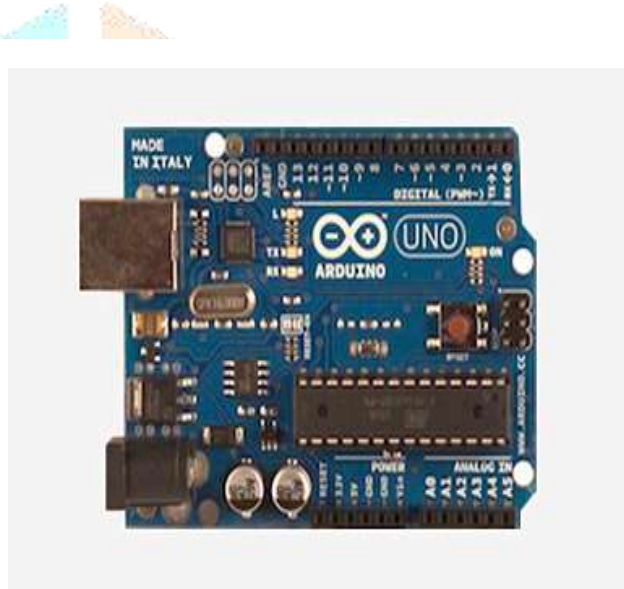
**Aurdino Pin Description:**
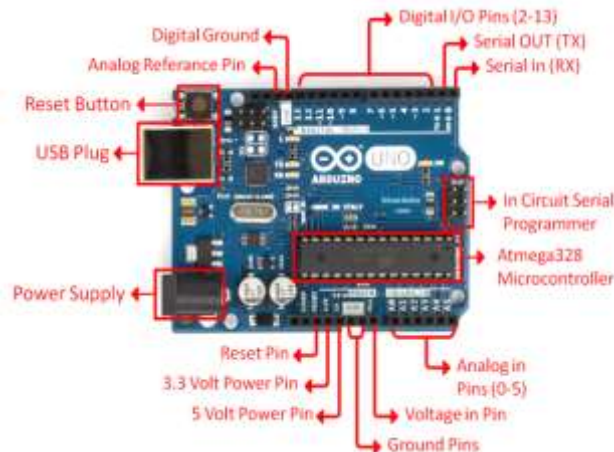
**4.1.2: Node MCU**

The ESP8266 is the name of a micro controller designed by Espressif Systems. TheESP8266 itself is a self-contained WiFi networking solution offering as a bridge from existing micro controller to WiFi and is also capable of running self-contained applications.This module comes with a built in USB connector and a rich assortment of pin-outs. With a micro USB cable, you can connect NodeMCU devkit to your laptop and flash it without any trouble, just like Arduino. It is also immediately breadboard friendly.



### 4.1.3:  IR Sensor:

An infrared sensor  is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor.

The emitter is simply an IR LED and the detector is simply an IR photodiode that is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.
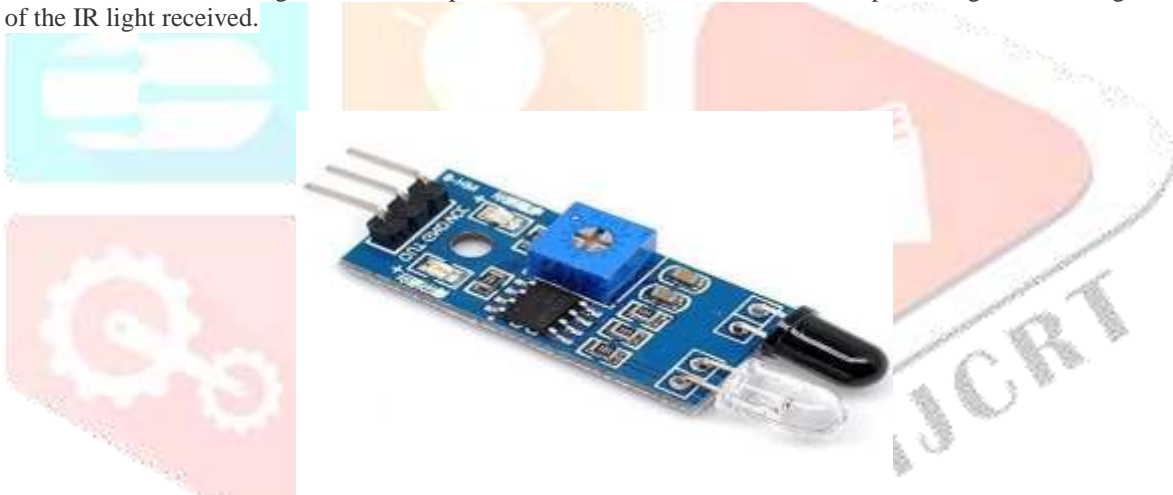


*IR Sensor Circuit Diagram and Working Principle*

An infrared  sensor circuit is one of the basic and  popular sensor  module in an electronic device. This sensor is     analogous to human's visionary senses, which can be used to detect obstacles and it is one of the common applications in real-time.
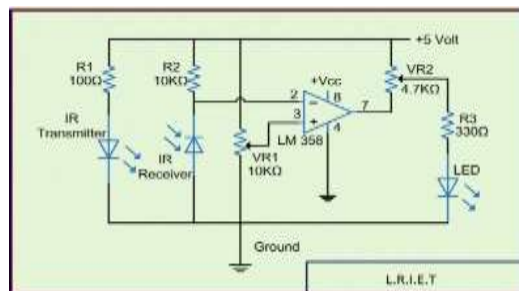


### 4.1.4:  Servo Motors

Tiny and lightweight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building amotor controller with feedback & gear box, especially since it will fit in small places. It comes with a 3 horns (arms) and hardware.
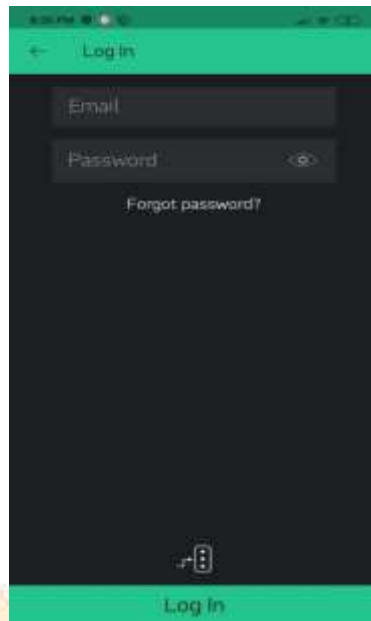
**4.2: SOFTWARE REQUIREMENTS:**
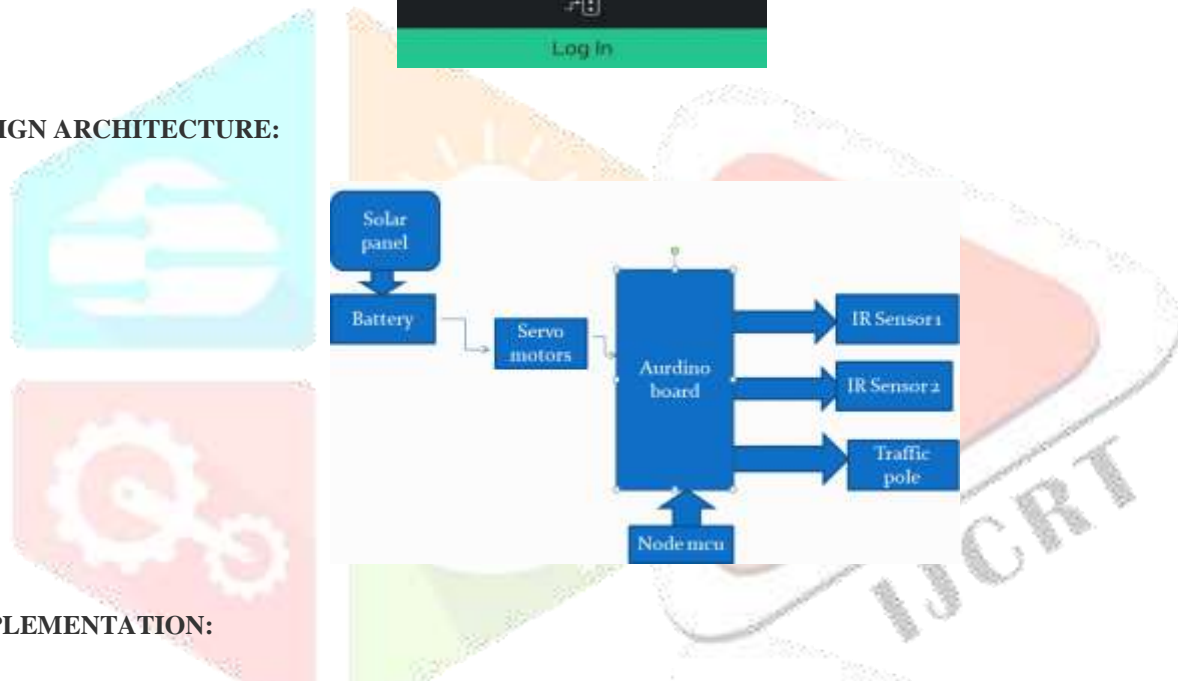
   **4.2.1**  Arduino Board:

**4.2.2    BylnkApp :**



**V.   DESIGN ARCHITECTURE:**



**VI.   IMPLEMENTATION:**

Power supply to the entire system is produced from solar panel. The panel is connected to a battery . Two IR sensors and the servo motors are connected to the aurdino board analog pins. After the density is detected by the IR transmitter on road lane the information is passed to the  IRreceiver. The IR receiver transmit information to the  microcontroller  through  aurdino  board   this  process  the  information  and  produce  a  digital  output  by operating tarffic signal according to the signals opening or closing the tollgate
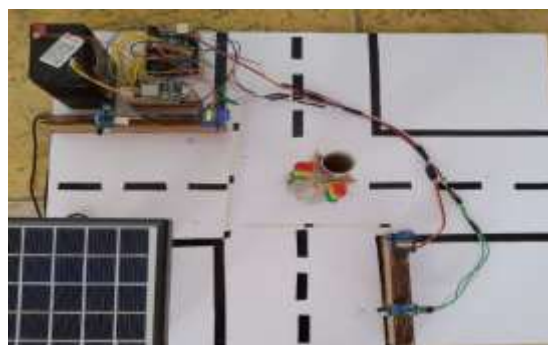


As extension to the present system, an emergency vehicle tracker has also been developed. In hours of tratfic, these emergency vehicles are stuck and don't get a proper aid or rescue. In order for these vehicles to reach their purpose a faster and appropriate traffic control has to be designed.

For this we are using blyk application which was given for emergency purpose. This will be installed in the emergency vehicle and operated by the vehicle drive.

## VII. RESULT FOR REFERENCE:
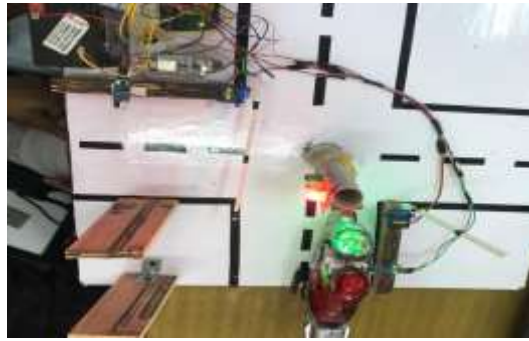


**GATE-1**
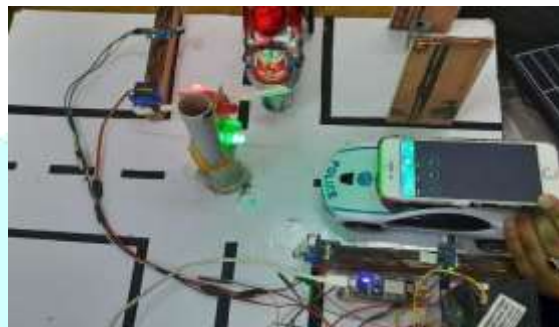


**GATE-2**

## VIII. CONCLUSION:

This method will help reduce congestion on roads and would help in coping with accidents as the heavy vehicles and light vehicles will be in different lanes. Resultantly, a solution to a much critical problem of traffic congestion and fatal accidents is possible using this system. Thus the proposed system would make our roads a safer place to travel.

## IX. REFERENCES:

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