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Design Smart Kerb Stone At Road Intersection

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Abstract

Kerb is an integral part of road infrastructure and performs several important functions, including providing stability to the edges of the road and providing effective drainage. Their performance can significantly influence the behaviour and service life of a road. With the more and more smart cities coming into existence the kerb stone can play a vital role in traffic management. The project deals with the development of smart kerb stone which can calculate the traffic density using sensors present on the kerb stones as well as automatically schedule the signals based on the traffic density. The smart kerb stone can also detect the pedestrians and activate the pedestrian signal for the safety of them. The proposed system is automatically night lit to show the directions to people. The proposed research work consists of development of automatic emergency vehicle lane system with hydraulically activated lane which will automatically detect the emergency vehicle in the path and activate the lane for immediate exit of the emergency vehicle from the traffic. The proposed project of smart kerb stone provides with different features for managing traffic as well as emergency vehicle detect and automatic exit system.

Keywords Kerb, Traffic density, sensors, night light, emergency vehicle detect etc.

Introduction

The kerb (British English) or curb (American English) is the raised edge of the road where the footpath or median is separated from the street or roadway. The use of kerbs was first discovered in the city of Pompeii, Italy, which was buried under volcanic ash and pumice in the eruption of Mount Vesuvius in AD 79. The main functions of kerb are to provide structural support to the edges of the roads and channel rainwater away . By providing effective drainage, it can reduce cracking and other surface and structural defects and effectively increase the service life of a pavement. The failure of kerbs often leads to excessive moisture ingress into the pavement structure, leading to the softening of the pavement materials, which can significantly affect the structural performance of the road and increase the repair and maintenance cost. Kerbs also help to reduce the risk of soil erosion, discourage drivers from parking and driving on the footpath and have a re-directive capacity for slow-moving vehicles . Kerbs improve the aesthetic aspects of a road and can be used as road markings. Sometimes a kerb is extended to obtain extra space for bench and planting or a refuge island for pedestrians at the median of the road. Traffic congestion is a condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, these results in some congestion .As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as a traffic jam or traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. In order to avoid the congestion in the traffic. In traffic environments, Traffic Sign Recognition (TSR) is used to regulate traffic signs, warn the driver, and command or prohibit certain actions. A fast real-time and robust automatic traffic sign detection and recognition can support and disburden the driver, and thus, significantly increase driving safety and comfort. Generally, traffic signs provide the driver various information for safe and efficient navigation Automatic recognition of traffic signs is, therefore, important for automated intelligent driving vehicle or driver assistance systems. However, identification of traffic signs with respect to various natural background viewing conditions still remains challenging tasks. Real time automatic vision based traffic light control has been recently the interest of many researchers, due to the frequent traffic jams at major junctions and its resulting wastage of time. Instead of depending on information generated by costly sensors, economic situation calls for using available video cameras in an efficient way for effective traffic congestion estimation.

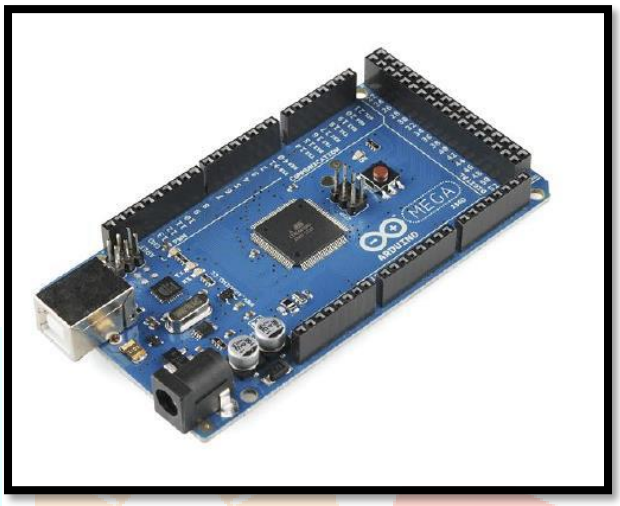
Objectives

- Smart Kerb Stone for Automatic Signal Scheduling System.
- Implement Smart Dusk Down Lightening System.
- Emergency Vehicle Detection Using RFID and Signal Rescheduling System.

Components

Arduino Mega 2560

For automatic signal scheduling, a micro controller is used. A micro controller is a self contained system with peripherals, memory and a processor that can be used as an embedded system for processing signals.



IR Sensors (Infrared Sensor)

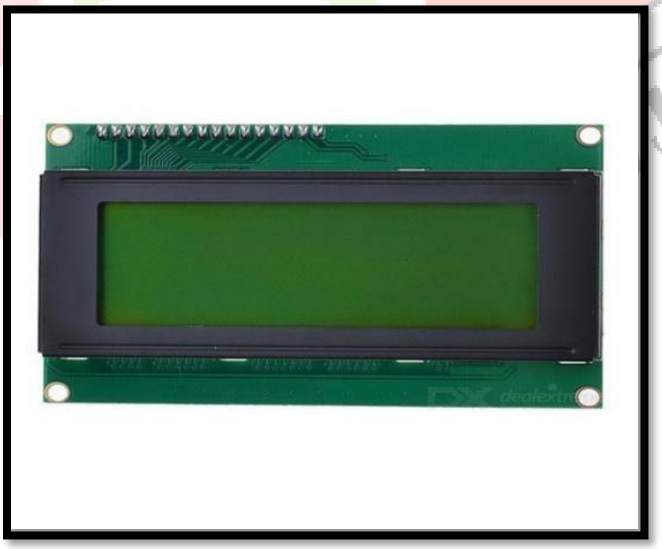
IR sensors are used to check the density of the traffic. IR sensors are placed alongside of the road to detect the traffic density and hence schedule the signals according to the same.

Radio Frequency identification.

RFID modem with tag is used for detection of emergency vehicles.

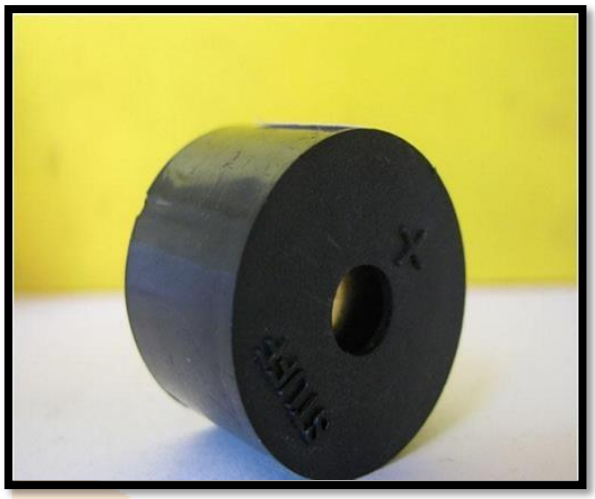
LCD display

The LCD display is used to give the visualization to and give the status of the hydraulic traffic reduce system.

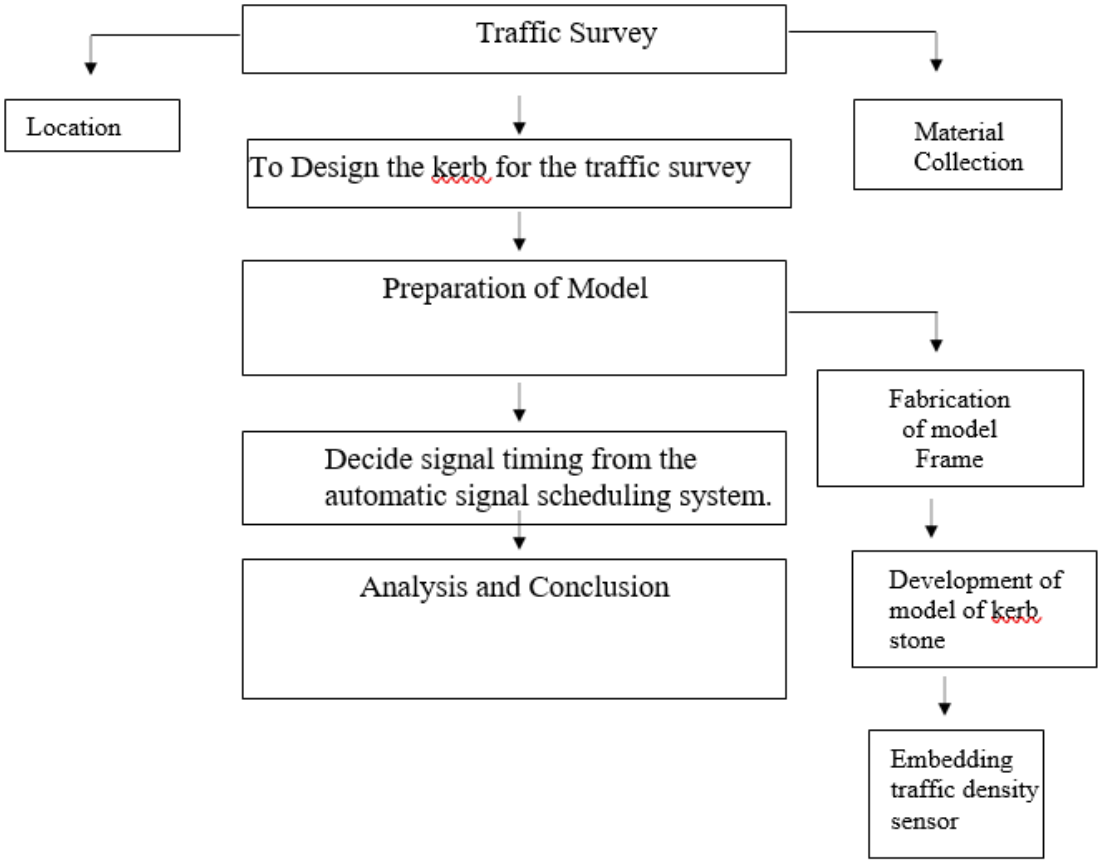


Buzzer

Piezo buzzer is an electronic device commonly used to produce.



Methodology



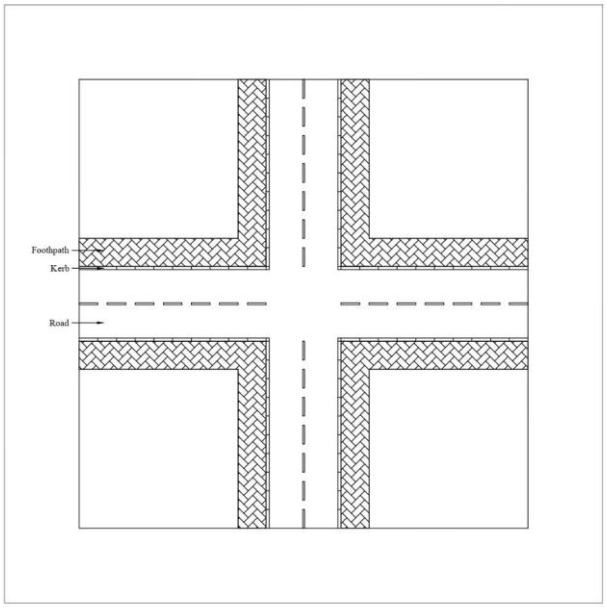
Traffic Survey

Data Collection

Area Selection – Chh. Shivaji Maharaj Chowk Ichalkaranji. (416115).

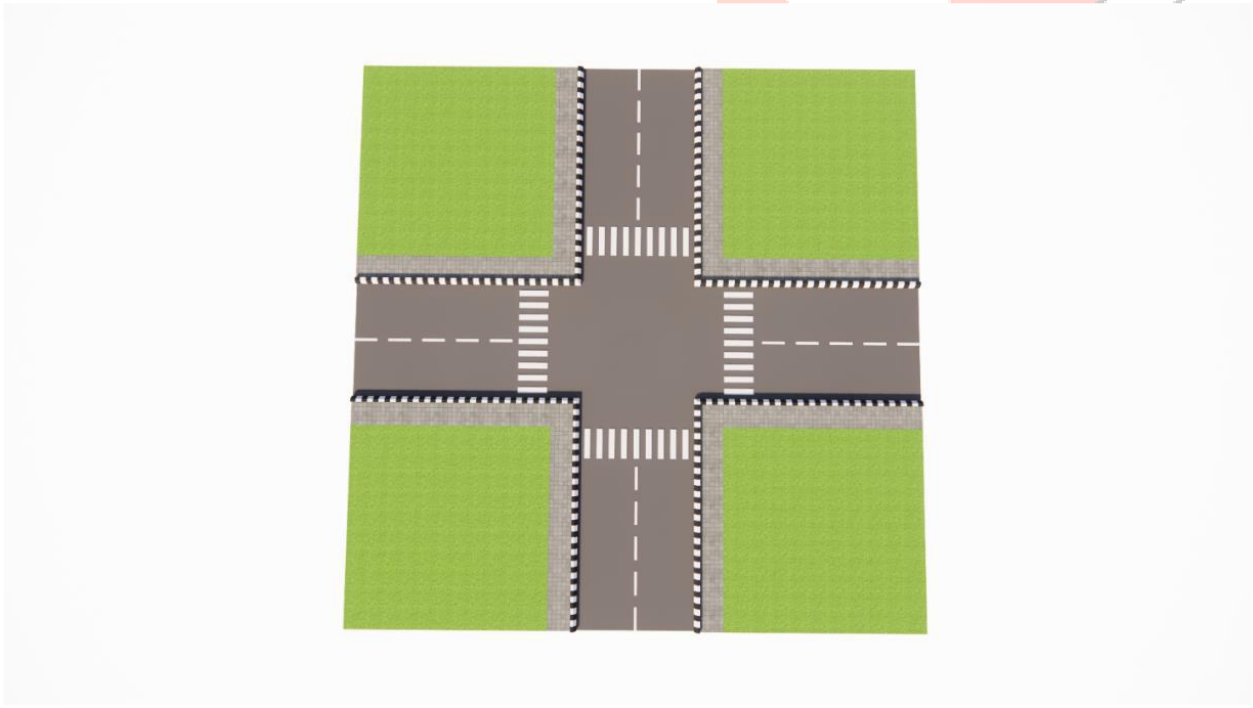
- Firstly we visited Ichalkaranji RTO Office, and then we meet the RTO Officer.
- After that we took information about Traffic Survey from them.
- Then we went to the actual site and counted the Traffic Density.
- As per signal time schedule we saw how many vehicles stops.
- Then we analyze how many vehicles pass in one hour.

Traffic Survey

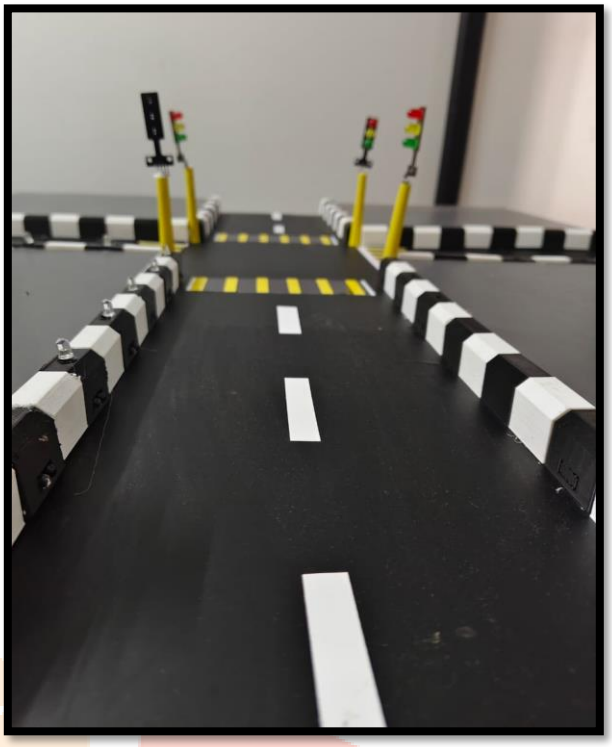


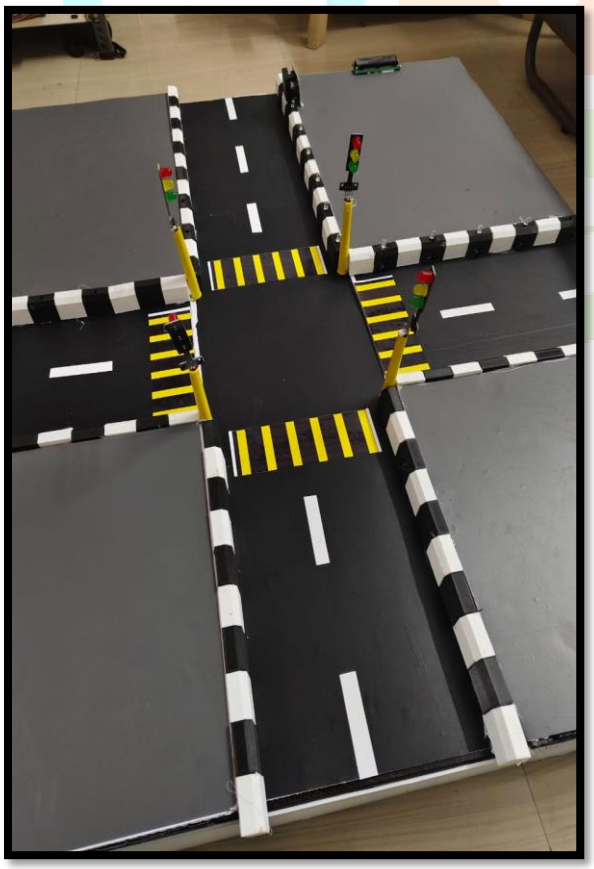
2D Design of Model.

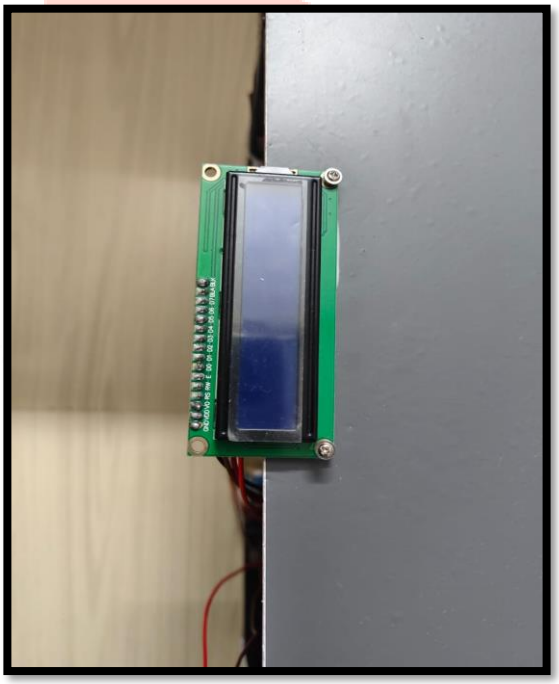
3D Design of Model.

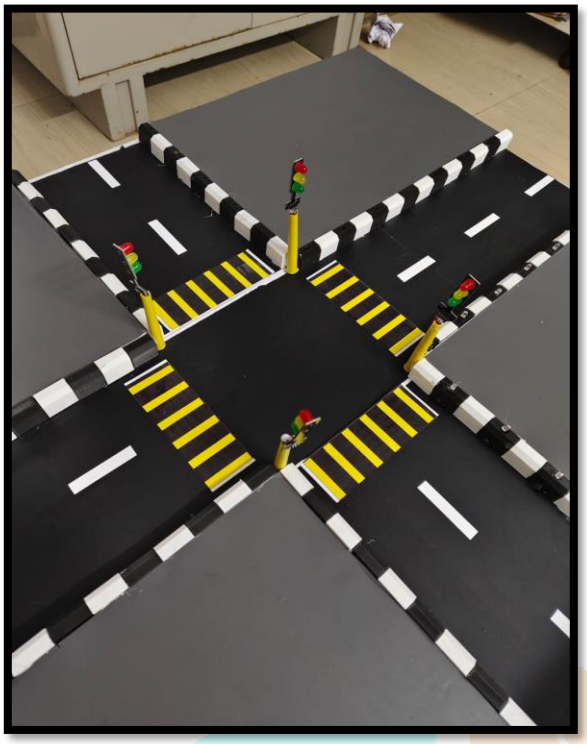


Model









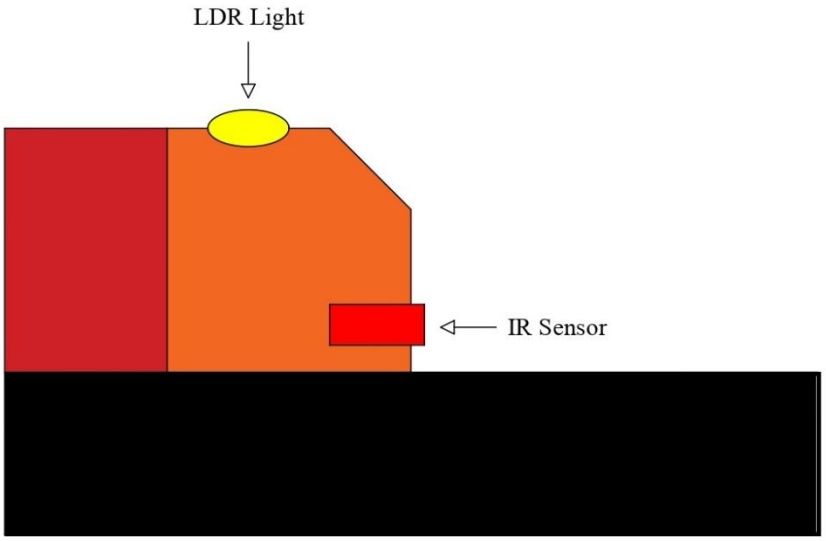
Model Size – 2'6" x 3'0"
Kerb Size - Length = 30 mm, Width = 15 mm, Height = 25 mm

WORKING PRINCIPLE:

The figure below shows the illustrative diagram of the smart kerb stone. The system consists of smart kerb stone which are mounted road side. The KERB stone structure is fabricated in such a way that it consists of multiple sensors of calculating traffic density, detection of emergency vehicle and automatic lighting of the kerb stone at night. As shown in the illustrative diagram the sensors present on the kerb stone automatically calculate the traffic density on the road, calculate the signal timings and adjust the traffic density according to the calculated signal timings.

Conclusion

Based on our result, We obtained that car / taxi are the majority of vehicle at the area. The second road users will be motorcycles, followed by pedal, moreover long period hours of observations should be performing in order to have a better understanding of traffic volume at junction.
In conclusion, our objectives of studies are achieved.



Reference.

R.S.B.Vanjale, SayaleeDeshmukh.“IOT based Traffic Signal control for reducing time delay of an Emergency Vehicle using GPS”, April 6-8, 2016, India. Issue 5page, IEEE ISBN:978-1- 5090-0396-9/16/$31.00 ©2016 IEEE.

Dheeraj Dang, JitinTanwary and SarfarazMasoodz.“A Smart Traffic Solution for High Priority Vehicles”, 4-5 September 2015 ,ISBN: 978-1-4673-6809-4/15/$31.00 ©2015 IEEE. Meera K, Mpho K. Madisal. “Android and Cloud based Traffic Control System”, ISBN:978-1-5386-3060- 0/18/$31.00 ©2018 IEEE.

Nicolas Smith, SoufieneDjahel, Shen Wang, and John Murphy. “Reducing Emergency Services Response Time in Smart Cities: An Advanced Adaptive and Fuzzy Approach”,ISBN:978-1-4673- 6552- 9/15/$31.00© 2015IEEE.

Prayushi faldu,Nishath Doshi.”Real Time Adaptive Traffic Control System” ISBN: 978- 1-7281-1322-7/19/$31.00 ©2019 IEEE.

Amit Bhat, Kaushik Roy, Prajesh P Anchalia,and Jeevith HM. “Design and Implementation of a Dynamic Intelligent Traffic Control System”| ISBN:978-1-4799- 8713- 9/15 $31.00© 2015 IEEE DOI 10.1109/UKSim.2015.12