Smart Traffic Flow Management System using ATmega 328 Microcontroller

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Abstract - *In developed countries, density of traffic congestion is requirement for defining congestion and measuring traffic flow. In this paper by using this system the traffic flow management can be done. Here instead of static road divider we used movable road divider. This divider is controlled by using motor driver. For traffic detection used image processing method to get the live traffic updates. The captured data through camera sent to the cloud for further processing. The decision of road divider shifting is done by analyzing density of traffic either side of road. .The movement of divider is decided by processed data. The data which is shared on cloud provides data to users.*

*Key Words***:   cloud, IOT, traffic congestion, image processing, traffic control, proportional shifting of road divider, camera, motor, lane.**

1. INTRODUCTION

The problem with normal road divider is that the number of lanes are fixed. Therefore availability of space of traffic is remains constant it does not provide space for traffic flow. In the automatic shifting of road divider it overcomes the demerits of static type road divider. By using IOT concepts this data can available for users through cloud. The decision of shifting road divider is depend upon the traffic density.

1.1 Objective

The objective of this paper:
1. To build smart movable divider system by using digital image processing, use of cloud for manual control.
 2. Movable road divider will proportionally shift the divider in left or right hand side for ongoing and incoming traffic.
3. By shifting, divider give more space to the heavy cogestion of traffic section on the road.
4. This system will help commuters to reach destination without wasting time.

1.2 Literature Survey

  Ms.Pallavi Chaudekar, et al. Invented the system that use to control traffic light by using image processing method. Instead of sensing vehicles by sensors this system uses image capturing process. By using analyse data traffic signal delay is controlled.

  S. Lokesh, et al. This paper uses advantage of image processing for traffic control. This paper avoid manual interfere in traffic flow management. Thus image processing analysis the improvement of road traffic. This system is based on RFID(Radio Frequency Identification).This eliminates the use of extra hardware. This also include the recognisation of vehicles by sound of their siren.

  B. Durga Sri, et al. The aim of the paper is to reduce the time of travelling in busy hours, prevent traffic congestion and provide smart solutions of traffic issues. This system uses ultrasonic sensors to sense vehicles and road zipper machine for shifting of divider.
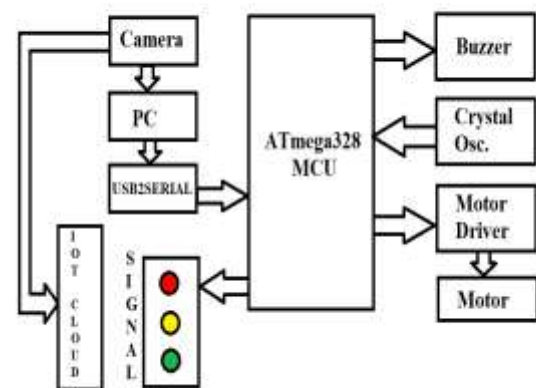
2. Methodology

Fig -1: Block Diagram

  The USB camera is connected to PC, hence the captured image by Camera is processed in PC using python programming language.

  After processing the data, this data is send to the cloud. The processed data is given to user for traffic updates.

  Other part of the processed data is given to the microcontroller using USB2SERIAL connection.

  Motor Driver is used to drive the motor which is integrated with the road divider. Motor driver is used to increase the current from 30-40 mA signal coming from the microcontroller to 1 Ampere which is needed for the motor. Here motor is used for divider. For shifting of divider right

and left it uses motor which is fixed bottom of divider. Here D.C. motor is used for giving motion to the driving mechanism. Rotary motion of motor is converted into linear motion with the help of thread on Lead screw and Stud. Dc motor's speed can control by variation in current that supplied to the motor.

3. OPERATION

In the Traffic Flow management System for input purpose here for input purpose system uses USB camera to capture an image in particular time of interval. This camera is connected to PC for image processing work. In PC, for image capturing and image processing python code is used. After processing of image PC provides the data consisting of count of cars on both side of divider. This data is transferred to the hardware. Depending upon case the shifting of road divider is decided by microcontroller. This system uses two ways to control the traffic. First way uses proportional shifting of divider and signal light controlling.
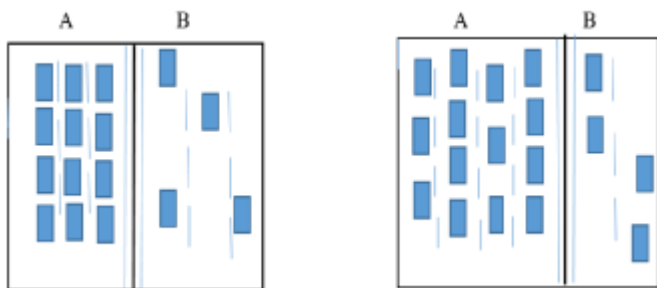
The working of road divider is as follows:

Fig -2: Operation of divider

In fig 2. As the number of vehicles are more in side A than side B, so there is congestion for vehicles.To avoid this problem by using motor driver the divider shifts towards side B to provide more space to side A vehicles in fig 2.This provide enough space to vehicles.

Another way to control traffic by controlling the signal dpends upon traffic on each side as shown in following figure.
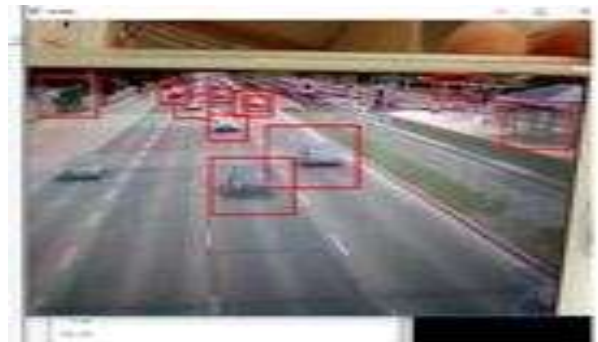

Fig -3: Traffic control by signal

Depending upon number of cars on each side of road the traffic signal light is control. By increasing and decreasing delay of signal lights. At the rush side green light will glow for more time, to get enough time for particular side of traffic.

4. RESULT

Car detection using python code:
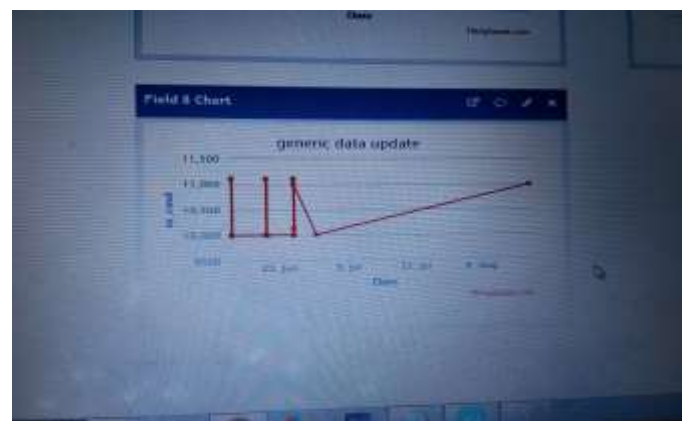

Traffic updates on cloud in form of graph:

Chart -1: Traffic updates after particular time interval

5. Future Work

1. Traffic congestion can be controlled using zipper machine.
2. Based on the values available in cloud actions can be made automatically.
3. For emergency vehicles we can provide various mechanism to reduce the time required for clearance of lane.

6. Conclusion:

In this paper, these system used to implement algorithm to control and manage the traffic by using image processing. This system avoids the chances of traffic congestion .It provide enough space to heavy traffic section. Among the various sections depend on the priorities clearance for the road is provided. For emergency vehicles the actual lane is given to the next priority and also traffic is cleared from particular lane.

7. References:

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