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An Intelligent Traffic Light Controlling System

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Abstract - Traffic control is the big issue in today's era. The management of traffic in India is also a tough job and only manual efforts can't stop this kind of problem so we need machines. We need a system that can handle such a situation effectively. Today's traffic control system is able to handle such a situation but not that much effectively because they are static in nature. We need a system which is dynamic in nature so that it can handle traffic smoothly and such a system called Intelligent Traffic control System**.** In this project we are creating the same dynamic traffic control system which has the ability to control the traffic as well as avoid the congestion of roads. In this project we are dealing with the traffic via image processing. Several traffic control approaches address the problem of reducing traffic jams. A class of them deals with coordination of traffic lights to allow vehicles traveling in a given direction. This project consists of webcam, processor & LCD display installed at each junction. Here each junction and its traffic lights behave like a social insect. Today's traffic control systems are based on microcontroller and microprocessor. This has lots of limitation one of the predefine structure which can't be handled by real time situation. The fuzzy logic control traffic system is described in 1995. The fuzzy logic controller follows the same pattern of schedule. Using the vehicle detection system the performance of the traffic control can be managed. Using different types of image processing algorithms the vehicle can be detected so on that bases the traffic lights can be switch.

Keywords- *Intelligent Traffic Light Controller, (TLC).*

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I. INTRODUCTION

A In India Transportation via road is the most widely used mode of transport throughout the country .annually there large amount of increment in vehicles and it corresponds in increased number of road users. Metro cities like Delhi, Mumbai etc. are facing the problems like road jams and the problems like congestions are needed to be sort out and this is impossible by traffic lights which works on predefined programs instead real time data .unfortunately these traffic controlling using lights which is currently exist have out-lived their purpose and as a result it is unable to handle number of vehicles on roads and also results in congestion which exists in most of the part of the cities in our country.

But there are many other ways to improve the currently existing system one of them is by introducing automation and intelligent methods to control roadside vehicles and infrastructure as the number of road users are increasing rapidly. The resources provided by currently existing Infrastructure are limited so to introducing Intelligent Traffic Light Controlling System and it will become a very important issue in near future**.** The main perspective of this paper is to design an Intelligent System which will control Traffic lights using image processing. This will result in smooth flow of traffic and avoidance of congestion. The system will firstly measure the traffic density at different signals and accordingly change the time delays for traffic lights the side at which the traffic is more and as a result green light will remain on signal. And lastly it will also communicate with neighbour junctions. In today era, Transportation is important. Because of this kind of transportation the traffic increases and, to reduce this traffic we need better traffic control system which is able to understand the situation of traffic and can change the controlling as per situation. Such a system will reduce the traffic without affecting transportation system. In this paper we are going to made a system which will give the new look to the traffic control system and can take dynamic decision like changing the time of red, green & amber lights.

II. LITERATURE REVIEW

Collision occurring at traffic signal or on crossing is important road issue .There are millions of traffic light signals in India to control traffic in India. But still it is not able to handle the congestion fully. The international road federation (IRF) estimated that traffic collision request in

annual monetary loss of $20 billon (INR / trillion) in India .the traffic light control system install at London in 1868. Since 1868 mini major/minor changes has been made in it. But still it not dynamic it can't handle demand of the situation because of its static behaviour. Traffic control plays an important part in our life so many papers and researches are published to solve the traffic problems. Some of these papers say: Robert A. Sowah designed and implemented a suitable Microcontroller based traffic light control system. The system developed is able to handle the traffic control presence or absence of on duty officer. Yong Cao, Zaiqing Nie, published a paper called Design of intelligent traffic light controller using embedded system. In this paper the predefine time schedule has been removed to reduce the static behaviour of the system. They also provide the GSM cell phone interface so that person can easily obtain the information about the traffic. In this paper they use the sensor network and embedded system.

- *PROPOSED SYSTEM ARCHITECTURE:*

The Intelligent Traffic Light Controlling System also uses the traditional light signal that is red, amber, and green. Vehicles get stop by using red signal. The amber light signal indicates readiness for further stop and green signal used to show that vehicles can move forward.

In this system we process data in image format, based on that finally signal lights are controlled.. As a part of research work, all junctions of karvenagar Area are selected for case study. At these junctions the nature of road is as there are four main roads and also some side roads. This nature makes junction four way intersection. By visiting the junctions, it seems there are four scenarios that the traffic light controls. This traffic signalling system is same for many junctions and it is used to control traffic on most of junctions for karvenagar area.it is not possible that we can change states of traffic light which is fixed but by using background differencing techniques we can control it dynamically. Like that we can assign more priorities to the road portions with higher queue lengths. Our base paper makes use of 16F877 microcontroller for building of system because it has high clock speed but we are avoiding use of microcontroller throughout system. That's why headache of maintaining the hardware part is easily extracted.

A. HOW INTERFACING IS DONE BETWEEN IMAGE PROCESSING ANALYSIS AND TRAFFIC CONTROL SYSTEM

On the top of the traffic light, camera is fixed to capture a video. Then from that video, images are extracted because our all processing algorithms require image frames as an input. Then this image is sent to the processing unit. This processing unit is located on server. The information regarding processing sent through Internet shown in diagram. Then the information received by server as an image gets flows through all algorithms. In which frame grabbing, grey scaling, blurring, image subtraction, Thresholding, detection of blob, tracking of blob and finally log for traffic get stored in database. On basis of this information, signals are updated with change in time clock.

If the processing unit does not receives any image then the signals operates on predefined time clocks.

III. SYSTEM IMPLEMENTATION

All processing algorithms work together to get finalised information

Grey Scaling: when image comes to the server for processing, it is of 24-bit. When grey scaling is performed then these images get converted into 8-bit image. For example image came for processing it should separate red, green and blue i.e. RGB. Each pixel of image are scanned and each pixel contains RGB values and blurring extracts these values to get grey scaled image. After extracting values of separate red, green and blue it get divided by three (3) and outcome value is places for that respective processed pixel. Likewise all pixels are processed. Following snapshots shows Grey Scaling effect.

For case study we are considering any image say image having penguins instead of traffic image.

Fig 1: Before Grey Scaling

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940 - 943

Fig 2: After Grey Scaling

Blurring: The outcome of Grey Scaling is given as an input for blurring. In blurring image is blurred. It uses very basic matrix logic like while processing image it takes blue color value from each pixel and same for red and green. Then it divides these values by 25 if matrix considered is of 5 by 5. Then it puts the calculated value same for all pixels.

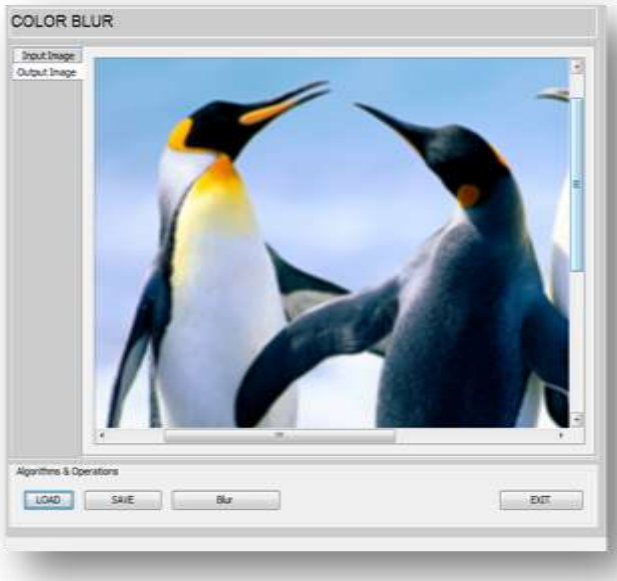

Fig 3: After Blurring

Thresholding: Thresholding converts 8-bit image into 1-bit image. That is complete black and white image. It converts by using threshold value, threshold value usually 128. The pixel having value less than 128 it get converted to logic 0 that is black and pixel having value greater than 128 get converted to logic 1 that is white. Likewise all pixels for image are processed.

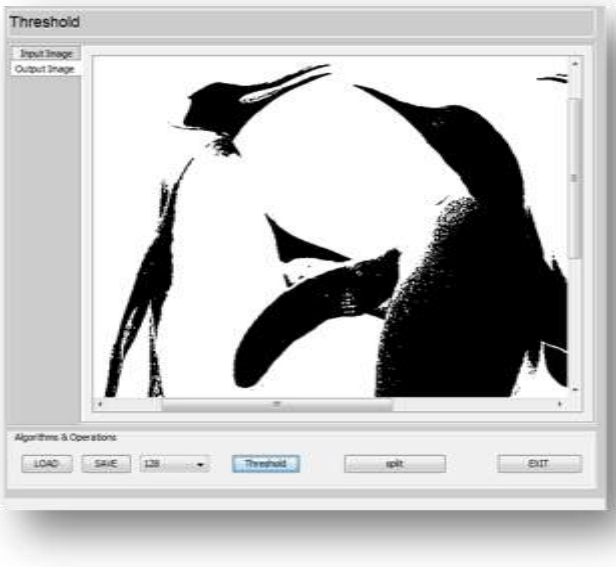

Fig 4: After Thresholding

Blob Detection: After performing Thresholding it easy to detect vehicle from image. Blob detection uses vector logic to find out continuous vehicle as a blob. It scans pixel by pixel and using co-ordinates it detects blob like if two pixels co-ordinates are matching at somewhere then these two pixels are get added to same vector or array. Each vector represents complete blob in image.

Direction Detection: If blob detected easily then it should be tracked to detect its direction. It used to keep track of vehicle that is in which direction vehicle gone.

Traffic Log: After keeping track for vehicle it is also important to count them. So in Traffic Log activity numbers of vehicles are counted.

Signal Time Updating: Finally data or information came from processing of image, signals given a clock time to burn the respective lights. If any lane if full of traffic then it will green light for long to avoid congestion.

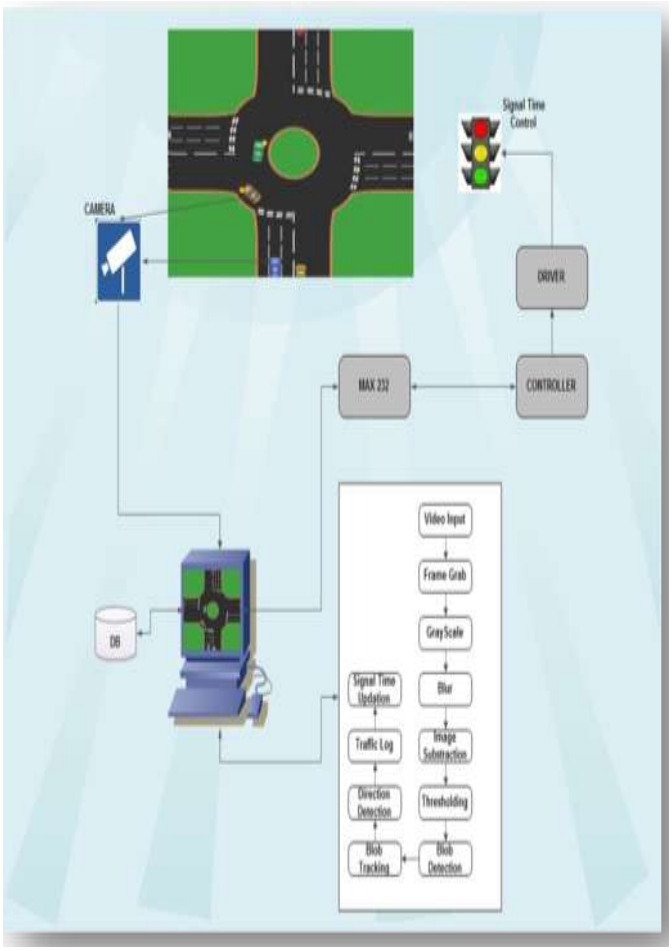

Fig : System Architecture

IV. ACKNOWLEDGEMENT

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V. CONCLUSION

An Intelligent Traffic Light Controlling System using Image Processing is able to process real time data and able to minimize congestion fluently occurring on roads.

An image contains real time data and this is picked out by performing image processing techniques. This data given as an input to system and traffic lights are controlled without using microcontroller. It provides best way to control traffic in rapidly growing countries.

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