Review on Intelligent Traffic Control With NO Parking Alert system

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Abstract—**Today the problem of traffic is ever growing. Industrialization, increase in population and non agricultural areas have heavily effect on population which further participate in sizable increase in number of vehicle which tremendous affect on the traffic congestion. There was one of big reason of increase in traffic is use old / absolute technology which further fail to manage in today's traffic congestion.**

The old traffic management technique has inbuilt problem such as Traffic signal light is fixed, there is no proper arrangement of Emergency vehicle such as ambulance etc. Further we found that there was bad traffic sense used by many people on traffic signal such as some time vehicles come on zebra cross and stand there wait for green signal this will effect that those who want to cross the road by using Zebra crossing they can't be. One of problem beside the traffic was there is no alert and quick action system for vehicle park in No Parking areas.

There was many researchers presents their views in favor of problem arise in traffic signal in various conferences and in journals and also they successfully overcome the problem but as we already know today's dynamic era technology grows fastly there is many different techniques are come up by which various traffic problems solves with high efficiently and economically.

Index Terms— **RF trans-receiver module, GSM module, LCD display, Camera, Buzzer, LEDs.**

I. INTRODUCTION

Today economy prominently based on transport system, the success of any economy based on type of transport it has. The importance of transport never be overlooked by any type of economy it may be developed or developing. The present transport mainly divide into air transport, water transport, rail transport and road transport out of which road transport system is very significant part of transport system. By help of road transport the various services can avail by the people of the nation at their door that why its also know as door to door transport, this road transport facing the various problems because of increases in population, as increase in population effect on increase in number of vehicles. This problem was managed by present traffic control system efficiently, but this present traffic system based on the predefined hardware which is program that does not have real time flexibility that means it can not managed and take decision its own or as per requirement of traffic condition.

The governments of every country enact various laws, rule and regulation for efficiently managed traffic within the country. This law, rule and regulation was amendment time to time to overcome the problem arise in traffic system, such as apply excess traffic police force and established new road infrastructure, construction of over bridges and under bridges, outer roads from city etc. which help to reduce the problem into traffic signal and other place where the traffic cognition found. But this implication of heavy traffic police force and large investment in road infrastructure not an ultimate solution to control the congestion over the road and on the traffic signal. Also this various solution was applied where there the problem arise that means firstly the problem was occurred and then after system apply the solution to overcome the effect arise from the problem. There is one proverb that *"Caution is better than Cure"* thus we strongly recommend that such problem to be anticipated in advance and by applying the proper system, so we no need to apply rehabilitation at various time, which further help to save our man force and other resources which can be use it in other importance work and places.

At present various problem arise in traffic control system some of given bellow.

a. Ridged time period for Signal:
   Present traffic system was ridged which based on fixed time interval where Vehicles stand at the traffic square and wait until the green light on. The reason behind this as because of the fixed time provide to red yellow & green light. let us suppose a in certain area because of heavy rush their road is always over crowded with verities of vehicles and if time provide to green signal is too short, so in that place vehicles can't pass through easily those area by road in the time allowed and further they need to wait until next green signal start. Thus, the given proposed system provides flexibility

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time interval for traffic lights according to crowd of vehicles present at each side of traffic signal.

b. Improper handling occurrence of an emergency vehicle:

The emergency vehicle such as ambulance, fire brigade and police van will be stuck especially at the traffic light junction because no special facility given by traffic signal to cross the traffic square. The proposed system handles the occurrence of emergency vehicle.

c. Inavailability of System to handling the bad traffic sense:

Many time we found that many people not follow the traffic rule on traffic signal such as they stand there vehicle on zebra crossing and park their vehicle in No Parking area. This will added the problem in traffic as bad traffic sense creates unnecessary crowed and problem on traffic signal and both side of road. The proposed system handles this bad traffic sense of standing the vehicle on zebra crossing.

In forming the above problems, various papers was already presented but all this problem not solve in one stroke. The researches all over the world work to find solution on traffic problems.

II. LITERATURE SURVEY

a. Traffic density calculation methods

On traffic signal on road intersections, for calculating traffic density on each side many methods are exists out of which the infrared sensor method is very easy and economic. The infrared sensor assembly are mounted on each road of traffic signal by which the presence and absence of vehicle is detected. This assembly act as input to the traffic light control system and the output of traffic light control system is give to Red, Green and Yellow signal lights which timing is set according to the vehicle density on the each side of traffic signal [1].

The infrared sensor can be measure traffic density by two methods. First, infrared transmitter and sensor are mounted across the road on each side of traffic signal and when any vehicle passing on road the infrared sensors get activated. Microcontroller controls the sensors and count number of infrared ray cut by vehicles on that road in sum variable time, which depends on traffic density of other sides, before making the signal Green for that side of traffic signal. Microcontroller detects the number of infrared ray fall on each sensor and increase number of vehicles count in recording interval for particular traffic light [2]. Depending on vehicles count microcontroller allot the Green traffic light signal timing because of which Red signal timing for other side of traffic signal vary. Three levels for Green signal time are as low, medium and high. Depending on number of vehicles these ranges are allocated. The system also store vehicles count data in database that is use in future to analyze traffic conditions.

Ashwini Dakhale proposed traffic control system based on vehicle density calculation is second method in which three infrared transmitter and sensors was mounted on either sides of roads on each side of traffic signal with some distance

before traffic signal. Whenever any vehicle passes on road between infrared sensor and transmitter, infrared system get activated. According to infrared sensors condition three levels of traffic density was decide less, medium and high. The traffic density is less when only one sensor ON, medium when two infrared sensors are ON and is high when all three sensors are ON. Microcontrollers take decision and update the traffic light delays depending upon vehicle density calculation [3].

On traffic signal for calculating traffic density image processing is reliable solution given by Muzhir Shaban Al-Ani. In this system on each side of traffic signal cameras are mounted which take image of road just before making the signal Green for that side and by image processing of this image, traffic intensity of that side measured and depends on that, system decides the signal opened time for that side of traffic signal. In measuring the traffic intensity, they measured the colure other than black because the colure of road is black and most of vehicles are of other than black colure [4]. The system then calculates the vehicle illuminated area with respect to road area.

Vehicle area = Sum of the illuminated areas / Total road area

Depending on flow of vehicles threshold is calculated and based on that main control system increments or decrement the time for intersection circle.

b. Emergency vehicle occurrence detection methods

Road user waiting on traffic signal for traffic signal to turns to green. The emergency vehicle like ambulance, fire brigade, police, etc will be stuck in traffic during traffic jam. Such situations are very complicated for emergency case [3]. Ashwini Dakhole suggests system, which have facility to emergency vehicle when it comes on traffic signal and number of vehicles available in front of emergency vehicle. When emergency vehicle come on traffic signal it is detected by system by sensing signals from emergency vehicle which send to sensor system and the traffic signal for that side of traffic signal will falls from Red to Green to pass the emergency vehicle and the signal for other side of traffic signal will be Red.

Sarika B. Kale present intelligent ambulance and traffic control system that solved the problem of traffic light by RFID based system. This system give priority to different type of vehicles simultaneously considers the density of traffic on traffic signals. In this system on traffic signal, there will be two RFID readers. On emergency vehicles, the RFID tag is attach and detected by RFID reader. When emergency vehicle come on traffic signal, the traffic signal current operation get stop mean traffic signal make red signal for other side of square and green signal for that side from which emergency vehicle come and facilitate to cross the traffic signal by which number of road accidents reduce [5] [6].

Ahmed S. Salma present intelligent cross road traffic management system that use long range photoelectric sensors mounted on some distances prior to and after the traffic signal so they can monitor cars that are moving toward a specific traffic signal. This data is transfer to software, which installed in traffic control cabinet, which controls traffic lights. The

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sensors are read by system for calculation of relative weight of each road they apply algorithm. According the systems open overcrowded traffic for longer time than time given for other traffic that have less traffic density. In contingency cases like occurrence of police cars, ambulance, fire trucks occurrence on traffic signal that require opened road. Such contingency case can be solved by two way: first, RFID tag are install in specific vehicle which require service and it is detected by RFID reader located before traffic signal and the system open road for specific vehicle. Second, mobile device is give to emergency vehicle driver that send specific radio signal to central control system to open the road.

Amnesh Gael presents paper on traffic signal system that were based on wireless sensor network in which traffic intersection communicate with neighboring traffic intersection to prioritize traffic clearance for emergency vehicles. Between road intersections sound sensors are installed, which help to give information about movement of emergency vehicle. The sound sensor detects sound whenever any emergency vehicles pass on road and send signal to next intersection point to clear the traffic. Sometimes when two or more than two side of traffic intersection loaded with emergency vehicle in such cases system give priority to that side from which system receive first message about emergency vehicle coming. The intersection system maintain information in memory about emergency vehicle event trigger and as one way will clear system switch to other side of intersection so the traffic will pass on.

c. Vehicle detection in No Parking space

With increase in world population and vehicle production by companies, large parking spaces require in traffic system. In cities, many time the driver park vehicle in No Parking areas by which other vehicles and peoples suffer. In such situations, traffic control authorized must have to take some quick action against vehicles, park in No Parking space. Amin Kianpisheh presents paper in that, system detect car park occupancy or car improper park. For detecting, system use ultrasonic detector. The system also display the available parking as it senses vehicle enter in parking area. Ultrasonic sensor use reflected energy transmitted by ultrasonic transmitter to analyze the status of parking space [9]. The ultrasonic sensor and transmitter mounted on selling of parking space and as any vehicle park on that parking space it detected by measuring the distance of reflecting space.

III. COMPARATIVE STUDY

For measuring traffic density use of infrared sensors is very simple and economical solution but in such system, many difficulties arrive after which the system performance degrades. Example, in paper [2] the microcontroller count the number of time infrared ray come on infrared sensor. So system count only vehicle and not consider the size of vehicle. So for any type of vehicle whether it will be two wheeler, car or truck, system allot same amount of time to cross the traffic signal square. In use of infrared sensor one more difficulty

arrive is, in situation when two or more than two vehicle pass on road side by side and cut infrared ray simultaneously. In such situation the system count only one vehicle because system count one vehicle for one time infrared ray cutting. In paper [2] and in [3] one common problem arrive is, the infrared transmitter and sensors are mounted on road on place where they can easily senses the vehicle presence when the signal for that side of traffic signal square is red. But on such places many times the number of unusable objects are come between infrared transmitter and sensor by which sensor are not capable to sense the infrared ray for time up till object present in front of sensor. Out of many solutions image processing is very efficient idea to calculate traffic density in which picture is taken by camera on each side of traffic signal square. The image processing help in measuring traffic density on each side of traffic signal square and accordingly traffic signal decide the time of Green signal for that side.

In detection of emergency vehicle the use of RFID technology is secure solution by which we can give priority to different types of vehicles like ambulance, police van or to fire bridged [5] [6]. However such system will not automatically detect the side of square from which emergency vehicle occurs on traffic signal square. Also RFID tag in emergency vehicle transmit only identity information to RFID reader install on traffic signal square and for transmitting other information like the information of side of traffic signal square where vehicle will want to go, another wireless technology require. Over this we found solution in which we use RF module on traffic signal square and in emergency vehicle. By which the vehicle RF module transmit identity information and turning decision information when emergency vehicle come on traffic signal square and driver press turning light button, microcontroller on traffic square receive this information by RF module. For finding the side of square from which the emergency vehicle come on square sound sensors are install on each side of square, which detected sound of emergency vehicle before it rich on traffic signal square. From this information, traffic signal system decides whether to glow green signal or not for side of square from which emergency vehicle come to traffic signal square.

In use of ultrasonic sensor for detecting vehicle in No Parking space have some advantages are low cast and easy installation but they have some disadvantages also like ultrasonic sensors can cover less parking space and they can use most of times in indoor applications. The ultrasonic sensors are sensitive to temperature changes and to extreme air turbulence [9]. Out of many solution for detecting any vehicle in No Parking space image processing is highest efficient solution. For which the camera is install on place, so that it can cover the whole area of No Parking. From images of this area, microcontroller finds the vehicle in No Parking area so the system can take some action against that vehicle.

IV. PROPOSED SYSTEM

With the increases of traffic, present traffic control system face lots of problems such as problem in proper management

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of traffic and congestion of traffic, thus there acute need to make proper changes in present traffic control system. This system is based on the work of present traffic problem and how to overcome this problem. In which system provide the solution of various traffic problems by using various electronic element such as RF modules, Camera, GSM module, Micro controllers, Sound sensors and LCD display etc. The entire system is divides into three modules.

a. Intelligent Traffic Signal Square

In first module, we develop the intelligent traffic signal square which measure the traffic density on each side of square by image processing in which picture is takes by cameras of each side of square just before making signal green for that side of traffic square. By the result of image processing traffic signal square, get information about traffic density whether is low, medium or maximum. Further this information use to proper management of time of traffic signal. While signal red for each side of traffic square, system also find the occurrence of vehicle on zebra crossing by image processing and if any, system alert by buzzer and if the vehicle not move from zebra crossing in some predefined time, the message will be display on control cabinet of square.

b. Maintenance of emergency vehicles on traffic signal

In second module we solve the problem of mishandling of emergency vehicle such as ambulance, fire bridges, minister vehicle etc. when it come on traffic signal square and take long to cross the square. In this system when emergency vehicle comes to traffic signal square it is detected before it reached on the traffic signal square by RF module, which install both on traffic square and on emergency vehicle. The side of square from which emergency vehicle come is sense by sound sensors, which is install on each side of traffic signal square. On the detection of emergency vehicle, traffic square senses the turning decision of emergency vehicle and if the emergency vehicle turn to his own side (in India is left side) there is no need of glowing the green signal for that side from which the emergency vehicle coming. In such cases the traffic square not glow the green signal for that side and traffic square worked normal operation. But if the emergency vehicle want to cross the traffic signal square the traffic signal square senses and make green signal for that side from which emergency vehicle coming and red signal for other side and emergency vehicle go through the traffic square.

c. No Parking alert system

In last module, we solve the problem of vehicle park in No Parking places, where system find vehicle in No Parking by image processing in which image is taking by camera in No Parking place. The LCD display placed in No Parking area which show the nearest parking place to the vehicle when any vehicles come to No Parking place. The system alert the vehicle driver by buzzer and wait for some short time and if the vehicle not move from that place the system message to traffic control office by using GSM module, so they can take some action against that vehicle.

V. CONCLUSION

We introduced such a system, which is a very dynamic approach for solving traffic system problems. This system use traffic signal time efficiently which will help to reduce the wastage of time and it also facilitate to emergency vehicle for crossing the traffic signal without too much hurdles. Further this system include the alert system which help to know the Vehicle Park in No Parking areas and also vehicle stands on zebra crossing on traffic signal.

On as final explanation as working we find that on the occurrence of emergency vehicle firstly it is detects and then traffic control system make adjustment in time and traffic signals on traffic square and give proper time to cross signal for that side from where the emergency vehicle arrive. In the given traffic control system the traffic square measure traffic density on all side of traffic signal square and then accordingly decide the time of green signal for each side. Thus for the side where the low traffic density found the traffic signal square system glow green signal for less time for that side and for high traffic density system glow green signal for large time. The given systems also act as the No Parking alert system in "No Parking" area. In which it first detect the vehicle stand in "No Parking" area and then alert the vehicle driver by making sound, further if it vehicle not moves from "No Parking" area system immediately send message to an authorized number which was already stored in the system for future action on No Parking. The given systems also have a solution over the bad traffic sense of people on the traffic signal. Such as when the signal is Red, then the people come and stand their vehicle on zebra crossing. Then the system find the presence of any vehicle on zebra crossing and then system firstly alert by making sound by buzzer and if the vehicle not move system give message to authorized person on traffic signal for further action on such bad traffic sense.

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