TRAFFIC LESS SYSTEM FOR AMBULANCES IN SMART CITIES

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Abstract— A microcontroller based intelligent traffic control system is used in this paper. Rather of changing traffic lights automatically for a given interval, this system allows passing the vehicles considering the number of vehicles on the roads. An At mega 32 microcontroller and infrared detectors (IR detectors) are used to apply the traffic system and an algorithm is also developed for this purpose. The appropriateness of using the roads of different metropolises confirmed by the results from the simulation and experimental test rig. No further reprocessing scheme is needed for this intelligent traffic control system. This design is more suitable, whenever the ambulance will come to particular way that time, suddenly the Green light will glow in traffic signal, also that time if any other. vehicle tried to cross the road means that time Spike system will get ON to damage that particular vehicle Tires. Traffic light control systems are extensively used to watch and control the flow of automobiles through the junction of numerous roads. They aim to realize smooth motion of buses in the transportation routes. Still, the synchronization of multiple traffic light systems at adjacent corners is a complicated problem given the various parameters involved. Conventional systems don't handle variable overflows approaching the junctions. In addition, the collective interference between adjacent traffic light. systems, the difference of buses flow with time, the accidents, the passage of emergency vehicles, and the pedestrian crossing aren't enforced in the Being traffic system. This leads to traffic jam and congestion. We propose a system based on Arduino UNO that evaluates the traffic consistency using IR detectors and accomplishes dynamic timing slots with different situations. Also, a movable regulator device is designed to break the problem of emergency vehicles stuck in the

overcrowded roads. The negative impact on economy, the environment and the overall quality of life happens due to traffic congestion. Hence it takes more time to manage the traffic congestion problem. There are various styles available for traffic operation similar as videotape data analysis, infrared detectors, inductive loop detection, wireless detector network, etc. All these styles are effective styles of smart traffic operation. But the installation time, the cost incurred for the installation and conservation of the system is very high. Hence a new technology, which can be coupled with the being signaling system that can act as a key to smart traffic operation in real time. This new technology has required lower time for installation with lower costs as compared to other methods of traffic congestion operation. This new technology has led to reduced business traffic. Bottlenecks has been detected early and hence early preventative measures can be taken therefore saving time and money of the driver.

Keywords—microcontroller, IR detector, Arduino.

I. INTRODUCTION

Traffic control and operation system is one of the most important issues for the ultramodern cities in utmost of the countries. Thereby, in Bangladesh, this issue is getting vulnerable day by day. In Dhaka megacity of Bangladesh, a large number of vehicles are moving in different roads every day. Also, the number of road vehicles is growing rapidly in other metropolises of Bangladesh like Chittagong, Khulna, Rajshahi etc. Because of space and cost constraints, the difference to this structure growth is slow as

compared to the growth in number of vehicles. Also, traffic system in Bangladesh is non-lane based and chaotic and also the pedestrian crosses the road and move through the road very unconsciously. Still lacking of a pedestrian friendly smart traffic system and manual operation system encourage them to be more unconscious regarding the business safety. Every time a number of people failed in road accident. Still a lot of road accident do due to manual operation of traffic system i.e. managing the road crossing with the help of a business police. For the metropolises of Bangladesh, a smart and cost effective traffic control system is necessary. On the negative, the traffic system of North America and Europe are more systematized and lane based utmost of the time. The structure is also applicable to support the traffic of the metropolises. The pedestrians are allowed to cross the road after pressing a switch in some part of these countries. Although everything is relatively well, significant amount of accident occurs due to not adhering traffic signal. So design a robust and pedestrian friendly traffic operation is essential for all of us. Basically traffic systems operate on a timing mechanism, after a given time interval the traffic system will turn on the light. The classical system uses weight as a detector mechanism. For these types of systems, the traffic police or driver has no option to control the system if any emergency situation occurs. Also, the classical system has no intelligence. That's why, the system itself cannot contribute for managing the vehicles to move efficiently. This has resulted in reduced road space in agreement with the number of total vehicles.

Population in developing countries similar as India is adding significantly. This result in a number of problems similar as heavy traffic jams, violation of the traffic rules and occasionally indeed accidents. For illustration, the number of road accidents in major metropolises such as Chennai, Hyderabad and Delhi increased to 16 deaths per hour, as stated by the Indian Government. Also, traffic congestion leads to long waiting times, fuel reduction and indeed money waste. In particular, business traffic contributes to high rates of operations impacting the health of the original population, shuttles and animals. Traffic traffic is frequently commonly associated with some other business issues, similar as the blocking of emergency vehicles. Precisely, the traffic congestion frequently blocks the path of the emergency vehicles which may Human Life is a actually precious thing for any country. The regular Circumstance of incidents and medical extremities such as fire, road accidents,

medical extremities etc. It's actually necessary that emergency vehicles arrive on time to help serious loss of humans. Therefore, hospitals and fire stations are throughout the city to reduce response time in case of similar extremities. A very rapid population growth in metropolises has acted in tremendous road traffic within the city. The average fuel mileage in India is only 3.96 kmpl. The major reason for this is traffic congestion. India is the 2nd most populated country after China in Asia, therefore with increase in population, the number of vehicles also increase. The profitable growth has clearly has had an impact on urban traffic. As the income rises, further and further people begin to go for cars rather than two wheelers.

In addition, in recent times the number of deaths due to delays in the appearance of emergency vehicle has risen to greater extent. Hence emergency services such as ambulances and fire machines must be on time to avoid loss of mortal life. In the current traffic situation, thus, helping an emergency vehicle move out of traffic congestion is very much important. Hence there's a need to manage traffic in a smart way as the operation of traffic with the conventional way similar as the signaling system for vehicular traffic is not having a major effect.

II. LITERATURE SURVEY

India is a developing country and the population of India is significantly growing. India stands within the 2nd place in the world in terms of population. As there will be increase in population gradationally there will be increase in number of vehicles, due to which the traffic congestion increases and because of which the exigency vehicles like ambulance, fire engine etc. face delicate to reach the destination in time. A promising system that can clear the traffic signal is especially needed in peak hours and therefore give a safe route for emergency vehicles is extremely important under these circumstances. In being literature there is lower focus show on the emergency vehicles to clear the trail, to overcome this issue a RFID based system is proposed by using this approach we will manage and regulate the traffic signals at junction which emergency vehicle approaches. Therefore, there'll be easy passing out for the emergency vehicles in traffic congestion. By using Arduino and LED displays a true time traffic script is simulated and an experimental setup is used to model the proposed frame work. This simulation results provides passing for the emergency vehicle to of holdback in peak hours. [1]

Each vehicle can be installed with a RFID label. This RFID label would store all the information regarding the vehicle similar as the vehicle number, etc. RFID markers can be used in relating each vehicle uniquely and also help the driver to admit some traffic dispatches. The being signaling system can be coupled with the RFID regulator. As described, each signal can have the information regarding every vehicle that passes by it. Therefore, when a vehicle passes by a signal, the signal can automatically keep the count of the vehicles passing by it, and help in discovery of traffic congestion. Each signal should be red and green, stored with a threshold value. Now depending upon the frequence of the vehicles passing by the signal per second, the timekeeper can be dynamically controlled. Each regulator of the signal should be stored with a value of minimal frequence of the vehicles passing by the signal. As soon as this minimum frequence is reached, the regulator should shoot a command to the signal to turn red. Therefore, the signal is controlled dynamically. For illustration, suppose for a signal, maximum time is set to be 30 seconds for which a signal can be red and maximum time is set as 20 seconds for which the signal can be green. The regulator is stored with the value of minimal frequency of vehicles passing by it per second as 5. The timer will start with a maximum value of 20, if suppose the signal turns green. Originally the frequency of the vehicles passing the signal per second is 10, after 10 seconds this frequency reduces to 5, and also automatically the RFID regulator sends a command to the signal to turn red. Therefore, the signal turns red and its conterminous signal in that junction turns green. This process continues in a cycle. Therefore, time wastage has been reduced by dynamic controlling of the signal and avoiding traffic congestion was the priority given to a high vehicular traffic road. This system helps in detection of traffic congestion. [2]

The traffic is major factor which contributes to the detention in reaching destination. This paper proposes an approach that when emergency vehicle is on the way then the way in which controls the Traffic Signals until it reaches particular destination. The position of vehicle is tracked by using GPS. This position is send to the application. The application performs the algorithm with the help of this data and the google chart. It controls the signals on its path. We introduced a new light which is blue in color to traffic signal to avoid the chaos in the mind of the people staying at the traffic signal. The proposed system is veritably

effective by using location provider data will be sent which is nearly very effective. The android application not only focuses on traffic light controlling and also send information to hospital so that arrangement can be done before the arrival of patient. The hospital will assign precedence to the case, to assign precedence the information is to be given by the staff with the ambulance. By changing lights chaos may be created among the minds of people staying at the signal will be taken care by the conception of Blue light which is an suggestion that the signals are changed. The emergency vehicle routing by introducing dynamic path planning combined with traffic light appropriation. As our results demonstrate, dynamic path planning has proven to reduce the emergency vehicle's travel time. [3]

Traffic lights are designed to insure smooth traffic in the metropolises. The current traffic system is running same over the once many times. As number of vehicles on the roads is adding constantly, this system is failing to serve traffic congestion problems especially on the corners. High Priority Vehicles (HPV) also get stuck in traffic due to traffic congestion which results detention in their services. HPV like ambulances, fire squad etc. have to serve colorful occasions. It's veritably important for HPV to reach on time. There's a need of system that aims to give path to HPV to reach as rapidly as possible. The proposed work provides priority based approach. It aims at building a user interactive system for HPV in which an HPV driver can shoot request to the system to which the system responds dashingly. Priority of Road Segments (RS) at an crossroad is calculated and traffic light turns green for the RS with highest precedence. In this paper we've performed traffic simulation for high precedence vehicles using SUMO and TRACI. To provide access to SUMO, here TCP based architecture has been used by TRACI. SUMO behaves like garcon and is responsible for simulation medication and some external element is taking control over the simulation. The customer is responsible for starting and closing the connection with SUMO. SUMO provides a lot of supporting tools with achievement in C, Python and other libraries. By using this model we can reduce the impacts of megacity traffic on the service time of an ambulance. The constant assistance to the ambulance at each traffic corners by turning the light green for the ambulance on its request has been provided by this model. The simulation results suggest that the proposed model can reaches its destination in lower

time and greatly reduce the time taken by ambulance. This paper laid emphasis on Ambulance as a HPV. Still it can be fluently extended also to be enforced for other HPV like Police, Fire Brigades. [4]

In the existing system, for the ambulance we don't have an Automatic Traffic Control System. To help hospitals in order to get the best services GPS technology is used. Here use of smart watches are more expensive, so we avoid this idea.

III. PROPOSED METHOD

Based on the number of vehicles in a road the proposed traffic system operates. The typical connection of four roads. For actuating the number of vehicles at a specific time, in each road equal numbers of sensors (S1 to S8) are connected. The sensors detect no obstacle if in front of the sensors, if there was no vehicle. It transmits high signal (logic 1) to the microcontroller as a result. On the other hand, if any vehicles are detected by sensors then low signal (logic 0) is transmitted. In the proposed method it presents two configurations: the first one allows the flow of automotive from road 1 then to road 3 as well as then turning to the right to follow road 4, while the alternative one permitted the cars to move from road 2 directly toward road 4 or shift to the left to pursue road. Here Fig.1 and Fig.2 shows the block and circuit diagram of traffic less system which has IR sensor, Density transmitter and receiver and Arduino IDE.

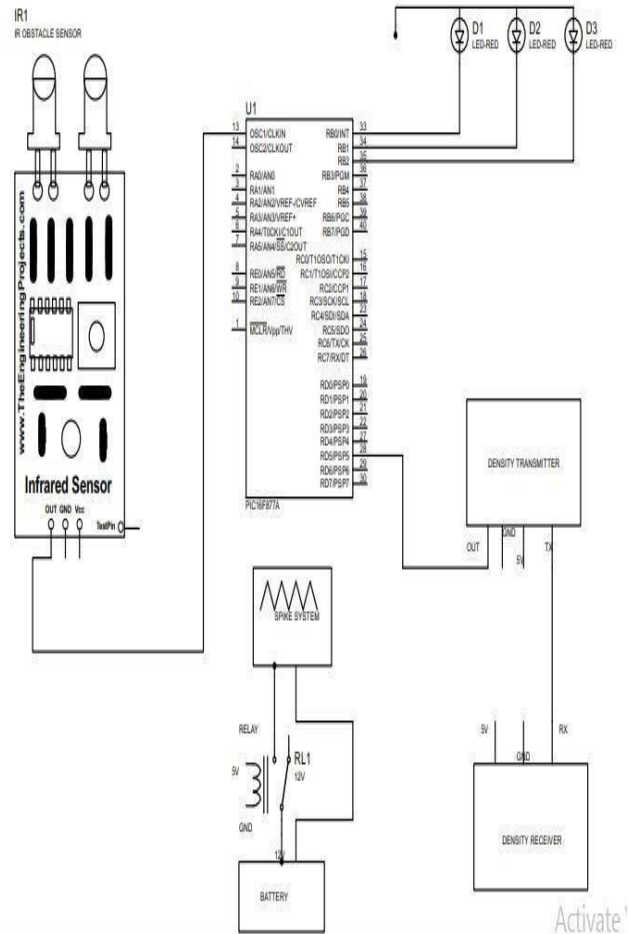Fig.1 Block diagram for traffic less system

Fig2. Circuit diagram for traffic less system

IR LED emits light, in the range of Infrared frequency. IR light is unnoticeable to us as its wavelength (700nm – 1 mm) is much advanced than the visible light range. IR LEDs have light emitting angle of approx. 20-60 degree and range of approx. many centimeters to several feet's, it depends upon the type of IR transmitter and the manufacturer. Some transmitters have the range in kilometers. IR LED white or transparent in color, so it can give out quantum of maximum light. Photodiode acts as the IR receiver as its conducts when light falls on it. Photodiode is a semiconductor which has a P-N junction, operated in Reverse Bias, means it start conducting the current in rear direction when Light cataract on it, and the volume of current flow is proportionate to the volume of Light. This property
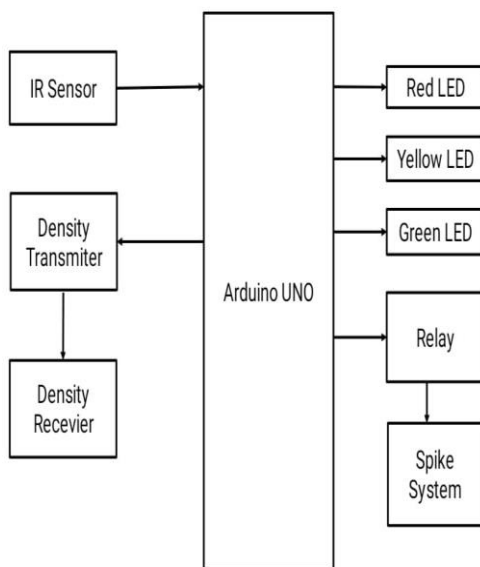
makes it useful for IR detection. Photodiode looks like a LED, with a black color coating on its external side, Black color absorbs the loftiest quantum of light. Here density transmitter and receiver is used to identify the traffic congestion.

A. IR Sensor

PIR detectors in Fig.2 are substantially used in PIR-grounded stir sensors. Also, it is used in security admonitions and automatic lighting operations. The below image shows a typical leg configuration of the PIR detector, which is relatively simple to understand the pinouts. The PIR detector corresponds to 3pins.Pin1 corresponds to the drain outstation of the device, which is connected to the positive force 5VDC.Pin2 corresponds to the source outstation of the device, which is connected to the gnd terminal via a 100K or 47K resistor. The Pin2 is the affair leg of the detector. Pin 2 of the detector carries the detected IR signal to an amplifier. Pin3 of the detector connected to the ground. Generally, a PIR detector can descry beast/ mortal movement in a demanding range. PIR is made of a pyroelectric detector, which is suitable to descry different situations of infrared radiation. The sensor itself doesn't emit any energy but passively receives it. It detects infrared radiation from the terrain. Formerly there's infrared radiation from the mortal body flyspeck with temperature, fastening on the optic system causes the pyroelectric device to induce an unforeseen electrical signal. Simply, when a mortal body or any beast passes by, also it intercepts the first niche of the PIR detector. This causes a positive discriminational change between the two bisects. When a mortal body leaves the seeing area, the detector generates a negative discriminational change between the two bisects. Here we use this PIR detector to check the movement of person in garage area.

IR detector in (fig 3.) is an electronic device, that emits the light in order to perceive some object of the surroundings. An IR detector can measure the heat of an object as well as detects the stir. Generally, in the infrared diapason, all the objects radiate some form of thermal radiation. These types of radiations are unnoticeable to our eyes, but infrared detector can determine these radiations. Here IR detector is used to detect the goods height

Fig.3 IR sensor

B. Relay

Relay is an electrically behave a switch. A introductory electromagnetic relay be made up of a coil of line wrapped around a breakable press centre a press yoker that gives a low seductive flux disinclination way, a portable iron architecture, and one or further contanct stes. The relay being used in our design and it works on 5v DC, its static current is 5mA, working current is 190mA. It's a typically unrestricted relay. The interface has a estimate current of 16A.

RESULT AND CONCLUSION

The main idea of this design work is to develop a cost-effective and intelligent vehicle business control system to manage the vehicles moving in different roads. The results from the simulation and experimental test carriage validate its connection for Dhaka and other metropolises of Bangladesh. Still it can be used easily to the metropolises of other countries also. The system consists of a microcontroller bedded with the control algorithm. The algorithm decides about the vehicles figures from detector data and takes necessary decision to clear the road effectively. The numerical values used for the programming can be changed considering the conditions of the roads, metropolises, vehicles and the system. This inflexibility makes the system effective to achieve maximum saving. Still, this system has some limitations. It cannot be controlled manually. To overcome this problems homemade mode can be introduced. In this mode the business police or authority can control the signal according to their conditions.

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