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Smart Traffic Management System

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ABSTRACT

Traffic congestion is becoming a grave problem in many big cities of the country. Unpredictable failure of traffic signals, poor law enforcement and bad traffic management has led to this grave problem of traffic congestion. The road traffic management strategy determines the objectives, roles, responsibilities and operational principles of Regional Transport Office (RTO). The main aim of this project is to provide a smart way to monitor and control traffic congestion on roads and emergency service vehicles. The appropriate places for placing radio frequency readers are selected so that the radio frequency tags on ambulance and fire-extinguisher truck can be read easily by the reader. This project will improve the current traffic system. To control traffic, some corrective measures are taken that are implemented in our system. In the proposed system, there will be barricades placed before zebra crossing lines so that vehicles will stop behind it systematically and nobody will be able to break the signal and go, thus, reducing number of accidents. This will ensure safety of all the pedestrians and all drivers. In this system, the emergency services like ambulance vehicle and fire-extinguisher truck are also given priority to reach their destination in time, thus reducing delay. The proposed system is designed to accept information about any emergency cases such as the passing of president, or any other VIP persons, ambulances, or fire extinguisher trucks using radio frequency identification technology. For implementation, we are using one Arduino-UNO and one Arduino-MEGA board and RFID technology. The system has the ability to open a complete lane for such emergency cases. As a result, the system will guarantee the fluency of traffic for the main vital streets and paths that require fluent traffic during peak hours of the day and the traffic density.

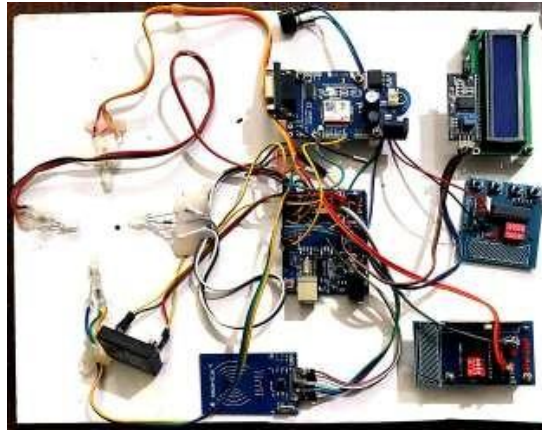
Keywords:traffic, traffic control, barricades, signals, ambulance, fire brigade, traffic congestion, accidents, RFID technology, Arduino Mega, Arduino Uno, etc.

INTRODUCTION

Traffic congestion on road networks is nothing but slower speeds, increased trip time and increased queuing of the vehicles. When the number of vehicles exceeds the capacity of the road, traffic congestion occurs. In the metropolitan cities of India traffic congestion is a major problem. Traffic congestion is caused when the demand exceeds the available road capacity. This is known as saturation Individual incidents such as accidents or sudden braking of a car in a smooth flow of heavy traffic have rippling effects and cause traffic jams . There are even severe security problems in traffic system due to anti social elements which also leads to stagnation of traffic at one place. In country like India, there is an annual loss of Rs 60,000 crores due to congestion (including fuel wastage). Congestion in India has also led to slow speeds of freight vehicles, and increased waiting time at checkpoints and toll plazas [3] The average speed of vehicles on key corridors like Mumbai-Chennai, Delhi-Chennai is less than 20kmph, while it is mere 21.35kmph on Delhi-Mumbai stretch. As per the transport corporation of India and IIM, India's freight volume is increasing annually at a rate of 9.08% and that of vehicles at 10.76%, but that of road is only by 4.01%. This has resulted in reduced road space in accordance with the number of total vehicles [3] .The average fuel mileage in India is only 3.96kmpl. The major reason for this is traffic congestion [3] .India is the 2nd most populated country after China in Asia, thus with increase in population, the number of vehicles also increase [4] .The economic growth has certainly had an impact on urban traffic. As the income rises, more and more people begin to go for cars rather than two wheelers [5] .

EXPERIMENTAL RESULTS

The hardware implementation consist of arduino UNO micro controller through which the RFID readers are connected internally. The GSM module for sending the SMS is also connected to the arduino. Both the arduino and the GSM module is powered with 1 Ampere regulated power supply each. A LCD panel was used to display the current situation the junction. RF receiver is connected to arduino to receive the signal passed from the transmitter in the ambulance. RF transmitter is powered with 9v battery. Four led lights is connected with arduino and used for simulating the traffic signal.



FUTURE SCOPE

In the traffic signal, the Arduino ATMEGA 328 micro controller is used. The power supply is given through the connector is from step down transformer. A transformer is used to step-down the AC voltage 230V to 12V. The stepped down AC voltage is converted into DC voltage using a bridge rectifier. An electrolytic capacitor is used as a filter. Voltage regulators are used to obtain the required voltage. Next the bridge rectifier is used to convert the ac supply to dc supply. Then it is given to voltage regulator which provides the constant dc voltage to the micro controller. Depending on the vehicles crowd the timing of the signals will change. The ARDUINO was used to programme the micro controller having timing control features. The RF receiver is fixed in the traffic signal control system to get the IR signal from ambulance having RF transmitter. The ambulance which emits the radio frequency of about 27MHz, continuously.

METHODOLOGY

The system follows a client-server communication structure to connect vehicles to the intersection control station. The intersection control station represents the server node that make the decisions for the vehicles that are passing the intersection, and the vehicles represent the clients of the system. Each vehicle is treated as a job that needs to be scheduled through the intersection.

EXISTING SYSTEM

In general, our research cover the literature review from various sources based on traffic control and vehicle tracking. This method examine the adaptive fine tuning algorithm to create a set of design parameters of two welldefined mutually interacting modules of the traffic responsive urban control(TUC)strategy for the large scale urban road network of the city of China, Greece. Computer simulation outcome are given, demonstrating that the network performance in terms of the daily mean speed, which is attained by the proposed adaptive optimization methodology, is significantly better than the original TUC System in the case in which the-aforementioned design parameters are mutually fine-tuned to virtual perfection by the system operation [1]. The system will develop the traffic light configuration, which will be able to determine three street case (empty street case, normal street case and crowded street case) by using small associative memory. The experiments presented provides promising results when the proposed approach was applied by using a program to monitor intersection in penesa island in Malaysia. The program could determine the street cases with different atmospheric conditions depending on the stream of images, which are extracted from the street video cameras[2]. To handle congestion in urban traffic flow through next generation artificial intelligence techniques is an important research area. Various intelligent and approach have been developed using sot computing techniques to tackle with this problem. This paper is an attempt towards revisiting such approach in developing modern traffic control systems[3].

This study focus on the utilization of RFID as a way of traffic flow detection, which transmits collection information connected to traffic flow straight to a control system using an RS 232 interface, At the same time, the sensor analyzes and Judges the information using an extension algorithm designed to accomplish the subjective of controlling the flow of traffic. In add-on, the traffic flow condition is also transmitted to a remote monitoring control system through ZigBee wireless network communication technology. The traffic flow control system developed in this study can execute remote transmission and reduce traffic accidents. And it can also effectively control traffic flow while reducing traffic delay time and maintain the smooth flow of traffic [4].

ACKNOWLEDGMENT

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Background A Radio Frequency Identification (RFID) system consists of RFID controller and RFID tag. 1) RFID Controller:

The RFID controller consists of RFID interrogator. This interrogator is used for the communication with the RFID tag. The RFID controller then gets the signals/data received by the interrogator. Messaging interference is used to send commands and data messages from the controller components. Controller core is present inside the RFID controller. The controller core listens to the interrogators and depending upon the configuration; the controller core can perform read/write operations upon the RFID tag or can do both listening and performing operations [5]. The RFID controller can have serial interface through which external GSM/GPRS devices can be interfaced with it to make a dual which make use of radio frequency electromagnetic fields to transfer data, which is used for identifying and tracking of the objects. RFID tags are of two types: Active and Passive [12]. Active RFID has a battery installed, which the passive RFID doesn't have. Passive RFID has to depend on external source for working. Tags information can be stored in a non-volatile memory. Tag consists of a Radio Frequency transmitter and receiver. Each tag can be assigned a unique serial number [13]

PROPOSED SYSTEM

The solution we provide for Traffic management by reading the RFID tag of each car by a RFID reader at traffic junctions for real time traffic density calculation. It also concentration on changing the traffic lights according to vehicle tightness on the road, thereby intent at reducing the traffic congestion on roads. In turn, it'll reduce fuel consumption and waiting time. In case of emergency vehicle like ambulance Radio Frequency module will be used so that red traffic light signals will be turned to green in order to provide a clear way for the emergency vehicles. It will also provide significant data which can help in future road planning and analysis. It is also used to detect or track stolen vehicle. It also alerts the owner of the vehicle to top up the credit which is used in toll booth. In further time period multiple traffic lights are often synchronized with one another with an goal of even fewer traffic jam and free flow of traffic.

The vehicles are detected by the system through RFID tag which is read by the RFID reader. RFID reader is present in some meters away from the signal and another RFID reader is placed alongside the traffic light. It will capture the number of vehicles in that particular lane. RFID is a better technique to control the state change of the traffic light since RFID is mandatory for all the vehicles in India. It shows that it can decrease the traffic jam and avoids the nonce wasted by a green light on an empty road. It is also more certain in estimating vehicle existence.

SYSTEM OVERVIEW

Each vehicle can be installed with a RFID tag. This RFID tag would store all the information regarding the vehicle such as the vehicle number, etc. RFID tags can be used in identifying each vehicle uniquely and also help the driver to receive some traffic messages. The existing signaling system can be coupled with the RFID controller. As described in figure 1, each signal can have the information regarding every vehicle that passes by it. Thus when a vehicle passes by a signal, the signal can automatically keep the count of the vehicles passing by it, and help in detection of traffic congestion. Each signal should be stored with a threshold value for which it should be red and green. Now depending upon the frequency of the vehicles passing by the signal per second, the timer can be dynamically controlled. Each controller of the signal should be stored with a value of minimum frequency of the vehicles passing by the signal. As soon as this minimum frequency is reached, the controller should send a command to the signal to turn red. Thus the signal is controlled dynamically. For example, suppose for a signal, maximum time for which a signal can be red is set to be 30 seconds and maximum time for which the signal can be green is set as 20 seconds. The controller is stored with the value of minimum frequency of vehicles passing by it per second as 5. Now suppose the signal turns green, the timer starts with a maximum value of 20. Initially the frequency of the vehicles passing the signal per second is 10, after 10 seconds this frequency reduces to 5, and then automatically the RFID controller sends a command to the signal to turn red.

CONCLUSIONS

With automatic traffic light control supported the traffic density within the route, the manual effort on a part of the traffic policeman is saved. because the entire system is automated, it requires very less human intervention. The vehicle information is stored within the database so it's easy to trace the stolen vehicle. Also SMS are going to be sent in order that they will prepare to catch the stolen vehicle at subsequent possible junctions. Emergency vehicles like ambulance, fire trucks, got to reach their destinations at the earliest. If they spend tons of your time in traffic jams, precious lives of the many people could also be at risk. With emergency vehicle clearance, the traffic light turns to green as long because the emergency vehicle is waiting within the traffic unction. The traffic signal turns to red, only after the emergency vehicle passes through traffic signal. also as if any vehicle violate the red light is fined automatically. Further enhancements are often done to the prototype by testing it with longer range RFID readers

REFERENCE

1. Sumi, L. and Ranga, V., "Sensor enabled internet of things for smart cities", in Parallel, Distributed and Grid Computing (PDGC), 2016 Fourth International Conference on, IEEE., (2016), 295-300.
2. Nellore, K. and Hancke, G.P., "Traffic management for emergency vehicle priority based on visual sensing", *Sensors*, Vol. 16, No. 11, (2016), 1892.
3. SmithaShekar, B., Divyashree, C., George, G., Rani, H.U., Murali, A. and Kumar, G.N., "Gps based shortest path for ambulances using vanets", in Proc. International Conference on Wireless Networks (ICWN 2012). Vol. 49, (2012).
- Djahel, S., Salehie, M., Tal, I. and Jamshidi, P., "Adaptive traffic management for secure and efficient emergency services in smart cities", in Pervasive Computing and Communications Workshops (PERCOM Workshops), 2013 IEEE International Conference on, IEEE., (2013), 340-343.
5. Sundar, R., Hebbar, S. and Golla, V., "Implementing intelligent traffic control system for congestion control, ambulance clearance, and stolen vehicle detection", *IEEE Sensors Journal*, Vol. 15, No. 2, (2015), 1109-1113.
6. Chowdhury, A., "Priority based and secured traffic management system for emergency vehicle using iot", in Engineering & MIS (ICEMIS), International Conference on, IEEE., (2016), 1-6.
6. Mittal, A.K. and Bhandari, D., "A novel approach to implement green wave system and detection of stolen vehicles", in Advance Computing Conference (IACC), 2013 IEEE 3rd International, IEEE., (2013), 1055-1059.
7. Garip, M.T., Gursoy, M.E., Reiher, P. and Gerla, M., "Congestion attacks to autonomous cars using vehicular botnets", in NDSS Workshop on Security of Emerging Networking Technologies (SENT), San Diego, CA., (2015).
8. Milanés, V., Villagra, J., Godoy, J., Simo, J., Pérez, J. and Onieva, E., "An intelligent v2i-based traffic management system", *IEEE Transactions on Intelligent Transportation Systems*, Vol. 13, No. 1, (2012), 49-58.