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Traffic Signal Jumping Detection and Real-time traffic data analysis using RFID

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ABSTRACT

In this system, named "Detection of signal jumping using (RFID) tag" is used as a superior alternative to the manual fine collection method employed at traffic signals. In order to overcome the major issues of vehicle congestion and time consumption RFID technology is used. RFID reader fixed at Traffic signals that reads the tag attached to the windshield of a vehicle. When Red signal is glowing and any vehicle cross the signal line then the fine automatically generated and deducted from users account. In cities heavy vehicles are only allowed at the time of night, when any heavy vehicle enters in city at day time then fine is generated and deducted from driver account. The object detection sensor in the reader detects the approach of the incoming vehicle's tag and fine deduction takes place through e-wallet assigned to the concerned RFID tag that belongs to the owners' account.

Keywords—RFID (Radio Frequency Identification).

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I. INTRODUCTION

Increase in population and urbanization in India are going hand in hand and as a result many smaller cities in India have become million cities. The increase in the number of million cities have created pressure on the exiting recourses in terms of infrastructure, traffic, roads, lights, housing etc. This has led to an alarming increase in the number of vehicles plying on roads on each of these million cities. It has brought congestion and huge traffic jams resulting in increasing the commuters' journey time and reduced speed. Because of increasing vehicles now a days it is very difficult for police department to to manage Proposed system we are using RFID/NFC tag for tracking vehicles whose breaking signal, track heavy vehicles in city at day time, vehicles which are coming in wrong direction, detecting stolen vehicle. So the Traffic police department needs automation to control increasing number of vehicles and also Vehicle users should get punished instantly when they breaks the rules and regulations of traffic department. Currently traffic police are overloaded with duties, which leads to traffic jams and unnecessary accidents. Traffic-signal control systems coordinate individual traffic signals and with the help of NFC tag detecting vehicles whose breaking traffic rules and generate fine. These systems communications network to tie them together, and a central computer or network of computers to manage the system. Coordination can be implemented through a number of techniques including time-base and hardwired interconnection methods. The proposed system avoiding traffic congestion, minimizes traffic rates and track vehicle whose breaking rules.

II. OBJECTIVE

To provide traffic police department a reliable application to generate and collect fines This system control the Traffic and monitor traffic, also helps in reducing the accidents ttraffic congestion, crime monitoring. In proposed system fine is generated when any vehicle breaking signal, Heavy vehicle passed in city at the time of day and detect stolen

vehicle System detect Person whose coming in wrong way and generate fine for this. And also Detect area where facing traffic congestion problem.

III. MOTIVATION

The main motivation of this system is control the traffic signal, rules breaking and fine collection NFC/RFID based traffic violation detection and stolen vehicle detection is aiming to establish the responsibilities and requirements for monitoring traffic signal breaking, heavy vehicle passing at day time in city, and tracking stolen vehicle . the efficient logic is developed in this project to solve certain traffic issues.

IV. LITERATURE SURVEY

“Priority Based Traffic Lights Controller Using Wireless Sensor Networks”-In this paper, the design of a system that utilizes and efficiently manages traffic light controllers is presented. In particular, we present an adaptive traffic control system based on a new traffic infrastructure using Wireless Sensor Network (WSN). These techniques are dynamically adaptive to traffic conditions on both single and multiple intersections. An intelligent traffic light controller system with a new method of vehicle detection and dynamic traffic signal time manipulation is used in the project. The project is also designed to control traffic over multiple intersections and follows international standards for traffic light operations. A central monitoring station is designed to monitor all access nodes.

“Real Time Traffic Light Control Using Image Processing”-This paper describes the problem of urban traffic congestion spreads, there is a pressing need for the introduction of advanced technology and equipment to improve the state-of-the-art of traffic control. Traffic problems nowadays are increasing because of the growing number of vehicles and the limited resources provided by current infrastructures. The simplest way for controlling a traffic light uses timer for each phase. Another way is to use electronic sensors in order to detect vehicles, and produce signal that cycles. We propose a system for controlling the traffic light by image processing. The system will detect vehicles through images instead of using electronic sensors embedded in the pavement. A camera will be installed alongside the traffic light. It will capture image sequences. The image sequence will then be analyzed using digital image processing for vehicle detection, and according to traffic conditions on the road traffic light can be controlled.

“RFID and GPS Based Automatic Lane Clearance System For Ambulance”-The focus of this paper is to reduce the delay in arrival of the ambulance to the hospital by automatically clearing the lane in which ambulance is travelling, before it reaches the traffic signal. This can be achieved by turning the traffic signal, in the path of the ambulance, to green when the ambulance is at a certain distance from the traffic junction. The use of RFID distinguishes between the emergency and non-emergency cases, thus preventing unnecessary traffic congestion. The communication between the ambulance and the traffic signal post is done through transceivers and GPS. The system is fully automated and thus, requires no human intervention at the traffic junctions.

"Smart traffic light control using fuzzy logic and wireless sensor network"- This paper presents the design and implementation of a smart traffic light (STL) using fuzzy logic and wireless sensor network (WSN). Designed for an isolated four way roundabout; the STL incorporates a WSN to collect traffic data in real time. This data is aggregated and then fed into a fuzzy logic controller (FLC) engine in form of two inputs - traffic quantity (TQ) and waiting time (WT) for each lane. Based on the inputs, the FLC then computes an output priority degree (PD) that determines order of green light assignment. Using the PD, a smart algorithm then assigns green light to the lane with highest PD value. The cycle continues until all lanes get green light.

"A comparative study on traffic violation level prediction using different models"- In this paper, the relationship between driver sex, age, years of driving, the type of vehicle, the ownership of the vehicle and the severity of the traffic offense were analyzed by using the 2015 traffic violation data from Guangzhou. The Bayesian network's model was used to predict the level of traffic violations. The cumulative logistics model and the neural network model under the training set were compared with the Bayesian networks model. As a result of the accuracy comparison, the Bayesian networks is about 70%, the cumulative logistic model is about 47%, the neural network model is about 51%. The results show that the Bayesian networks model can better predict the level of traffic violations.

V. SYSTEM ARCHITECTURE

First of all, RFID tag will be fitted to vehicle which user is going to purchase. Every vehicle will have it’s unique RFID tag number. The vehicle will be driven on the road. If the vehicle stops at the signal before the zebra lines when it is red, no problem, the

rule is not violated. But if the vehicle crosses the zebra lines even if the signal is red, tag on the crossing lines will detect the RFID tag number applied to the vehicle.

RFID tag on the crossing lines, through it's radio frequency waves will signal to the controller which is fitted inside the signal. Controller is a very low costing, small in size chip which will be fitted in the signal to detect the RFID signals sent by the tag on the crossing lines.

Controller will send a request to the server to draw out the information which will be saved in database of it. After receiving the request from controller, server will work on controller's request. After retrieving information of that particular vehicle, two responses by the server will be made:

1. To the application (so that the data of this vehicle will be stored on the application).
2. To the user who has violated the rule by jumping the signal.

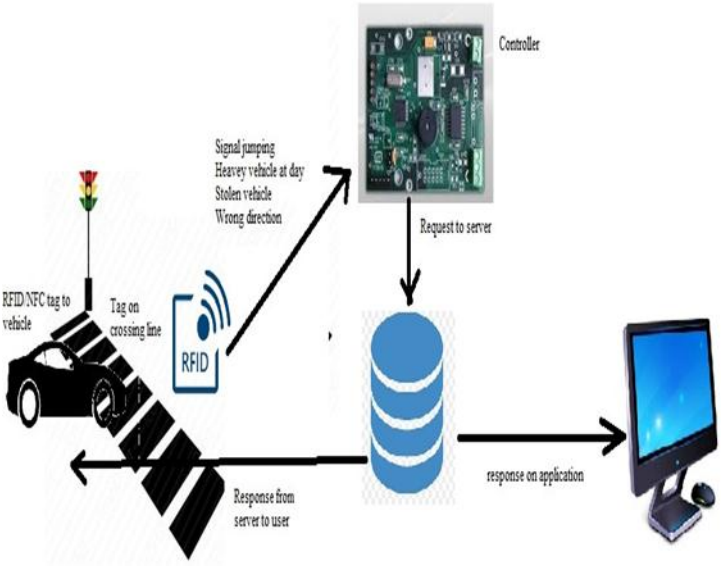
Response to the user from server will be regarding the payment of fine as it jumped the signal.

In concise, the system architecture of this model is:

1. We will develop hardware kit of project initially
2. We will test whether RFID tags are getting scanned by RFID readers
3. We will then write web app is to transfer RFID data to server for further processing
4. We will then write business logic of our project which will cut fine from user breaking the rules
5. We will then test the system using manual testing and user acceptance testing

The same working will be applied to all other modules like :

- Heavy vehicle detection
- Wrong side detection
- Fine collection



VI. ADVANTAGES

1. Accurate detection of all traffic violator
2. Fast access.
3. Saves time.

VII. CONCLUSION

The developed application is easy to use, economical and does not require any special training. System simplifies the police work by automation. This system will stop generation of cash and will increase digital payments.

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