Advanced Road Traffic Management System

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Abstract:- In today's time, transportation mediums like cars and buses are playing a vital role in our everyday life. They are one of the most suitable modes of Transportation. We go to the offices, works, school/college etc using this mode of transportation. We even use them to go to the shop or market. Most of us use public bus transportation services, whereas some prefer to use their private vehicle for the same. Use of this mode of transportation has become an essential part of our life. But these transportation modes also have some disadvantages too. Assume that you are running late for your work/school/office and you stuck in the middle of a traffic jam, quite irritating isn't? Suppose there is someone who is fighting for his life inside an Ambulance[2] stuck in a traffic jam. What will you do? You will Blow the horn frequently? Shout on the peoples to clear the traffic jam? But nothing will help. To solve such issues, this paper proposes a system that will help people with their transportation without being stuck in a traffic jam.

I. INTRODUCTION

In today's time, everybody maintains a tight schedule of their busy life. No one loves to stuck in a traffic jam and being late for their jobs/schools. But in a developing country like India, it is a common thing to stuck in road traffic jams and getting late. But who could be blamed for it? We often find cars of popular celebrities/Politicians/government officials being stolen[3] and later used by criminals for criminal activities[4]. But how to stop such cases?

II. RELATED APPROACHES

First of all, we need to take a survey on all the available road options within that area. This can be done using local government agencies, NGO's or with the help of local people or we can just simply assign a private organisation to create a road map of the area. Special high-speed sensors will be fitted along with traffic lights to detect that a vehicle is approaching.

The term ARTMS stands for Advanced Road Traffic Management System, a device consisting of high-speed barcode/QR code or 3D hologram scanners, a data storage medium for temporarily storing scanned data and a data communication device for sending the scanned data to the central server for further processing. After the road map has been created, the portions of the road where the ARTMS devices will be required are discussed and installed. They will be known as Checkpoints. These checkpoints will also contain special speed breakers with spikes that can be controlled remotely from a headquarter. The special barcode/3d hologram will be pasted on each vehicle number plates or on the left side of the vehicle and that will be unique for each vehicle. These special barcode/3d holograms will be compulsory for each vehicle and will be scanned at the checkpoints using high-speed automatic scanners and the scanned results will be sent to the main processing centre through data communication cables. Additional roads/flyovers will also be constructed if a particular area lacks an alternate road option. The ARTMS device itself will contain the anti-theft system, to protect it from any kind of modification/alteration by unauthorized persons. This anti-theft will include an alarm system that will report immediately to the central control room that someone has tried to alter the ARTMS of this particular location, a camera that will take photographs of such intruders and a buzzer-based alarm that will produce large enough sound to scare such intruders.

III. WORKING METHODOLOGY

The sensors will sense that a vehicle is approaching. Checkpoints will slow down the vehicles using speed breakers, then the ARTMS devices will immediately scan the unique barcode/3d hologram and will send the vehicle information's like exact time of arrival of that vehicle to the checkpoint, what was its speed while approaching and leaving the checkpoint, and of course the registered vehicle number is given by government. All these data collected from different checkpoints will be stored in a central database and then combined and processed. These databases when analysed using computing power and algorithm, will give details like which car went on which direction, what is the number of cars crossing that checkpoint, are there any expected road traffic jam? We can use these data to avoid traffic jams and if there are any expected traffic jams, we can immediately guide the vehicles to change their path/street using traffic signals and digital navigation system and guide them through a new street/road. Such a way, we can provide uninterrupted transportation facilities within a city. No Ambulance will ever be stuck at traffic jams[2], no VVIP or any such important person will ever be stuck at traffic jams, threating their security. Since there are also remotely controllable speed breakers with spikes, that can be activated

to help the police to catch the criminals during a high-speed car chase or to catch smugglers. As we can keep track of a vehicle's location within a particular time, so we can get an immediate idea on where the vehicle could be and it will become easy to find such stolen vehicles. Moreover, since this barcode/3d hologram will be unique for every vehicle and will be scanned many times in the checkpoints throughout a day, it will be easier to identify if someone tries to perform any criminal activities using a fake/duplicate barcode/3d hologram of someone else's vehicle. Moreover, as we have data of what types of vehicles mostly run on a particular road, we can estimate the time within which the road is going to need repairs and thus allocate funds accordingly. As it keeps track of vehicles passing through a particular checkpoint, this could also help to track any vehicles suspected to be carrying any illegal drugs/weapons/black money etc. Moreover, the central database will also hold information's like vehicle owner name and addresses, vehicle insurance information etc. these can be helpful in case of an immediate police investigation. Police can easily find out the vehicle insurance details. With further improvements, it will also be possible to find if a particular vehicle owner has a valid vehicle license or not, thus helping the police to take necessary actions upon vehicle drivers not having a valid vehicle license and thereby reducing the chances of road accidents[1] as the number of people driving vehicles without a valid license will be greatly reduced. We can easily find the persons/vehicle owners who usually disobey the traffic rules, Thus keeping everything under control of Police/Government.

Moreover, using digital navigation system fitted within a vehicle and connected to the central ARTMS database using internet/GPS, we can guide the passing cars on the road through a new road in case of any car accident or ongoing road repair work or any other natural calamity. We can also guide tourists to their destination. But GPS alone cannot be used as accuracy of GPS[5] depends on additional factors, including satellite geometry, signal blockage, atmospheric condition and receiver design features/quality.

IV. CONCLUSION

To help a Developing country in its development, it is required to keep it up to date with the latest technologies. The Government have been looking for ways to solve the problems of traffic jams permanently Using technologies. By observing the current situation, we have thought of using centralised road traffic control technology to enhance the efficiency of roads. The average amount of time a car has to wait while stuck in a traffic jam will be greatly reduced, thereby providing better road service with less or almost no traffic jams. For that, we have proposed a way to automate the process and keep track of all the vehicles running on the road in order to guess any expected traffic on the road and then guide them through automated signals to avoid traffic jams.

The proposed system also allows to detect frauds related to the vehicle registration number, it will detect any vehicle with a duplicate vehicle registration number, thereby reducing vehicle misuse or fraudulent activity with someone else's vehicle registration number.

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