

# Intelligent Traffic Management System

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## ABSTRACT

*India is the second most populated country in the world which is the contributing factor towards increasing traffic on the roads. There is static happens that there is no traffic on the opposite signal and still the vehicles have to wait for the given time. This can be avoided using ITS (Intelligent Traffic Management system). ITS allocates waiting time depending upon the number of vehicles present on the road. The allocation of time is dynamic. In addition to it, it allows passage of emergency vehicles by prioritizing them to high. This ensures that they meet their specified deadline in time. Also the user who breaks the rules of the traffic can be detected and can be fined automatically. If a user carries an invalid or expired license, it can be detected and can be fined. ITS also provides a provision of Detecting the stolen vehicles. The unique id number of the RFID can be changed to stolen to make it recognizable and find it.*

**Keywords:** *Control flow, RFID, Vehicle count.*

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## Introduction

Traffic is emerging as one of the major problems in urban areas these days as the number of vehicles is increasing with a huge amount. This has led to traffic congestion on the roads which cause uncertainties in meeting deadlines. The current traffic signals allocate static waiting time statically where mostly it so happens that there is no traffic on the opposite signal, yet vehicles have to wait until the statically allocated time is completed. This not only increases consumption of fuel as well as increases the waiting time. The proposed system ensures dynamic allocation of time to the vehicles. In addition to it, ITS (Intelligent Traffic System) provides some excellent features such as Emergency vehicle detection, Stolen Vehicle Detection, Rule breaking Detection.

## Motivation

To overcome the demerits of current system, the proposed system ensures the efficiency and accuracy over the current system. Due to uncontrolled flow of traffic, consumption of fuel increases and wastage of time also becomes an issue. Emergency vehicles such as ambulance, fire brigades have certain deadlines to be met. Failures in these aspects can cause outcomes which can be fatal.

## Intelligent Traffic Management System:

### Working:

Basic idea of ITS is to provide the waiting time at the signals dynamically i.e. the waiting time is allocated according to the number of vehicles present on the traffic signals. Less the number of vehicles, less will be the waiting time allocated. This decreases wastage of time at the signals as well as it reduces the fuel consumption. The emergency vehicles are given higher priorities at the traffic signals, which enable them to meet their deadlines at given time. A vehicle can be updated as stolen and can be detected easily. The vehicle information needs to be updated as stolen if it is stolen. The RFID reader reads the stolen RFID number and detects it.

## Major Components of ITS

### (i) Intelligent traffic control:

One of the major components of ITS is Intelligent control flow of traffic. This component is responsible for making the flow of traffic efficient and less congested. This operation is done by allocating the waiting time dynamically. There are IR sensors placed on the roads at a pre-defined distance. These IR sensors have the task to count the number of vehicles and update it into the required database. These values are stored in the database and accordingly the information is sent to the signal control. The waiting time is then allocated on the signals depending on the traffic of the roads. In short the waiting time totally depends on the count of the vehicles. No static allocation of time takes place which avoids redundant waits at the traffic signals.

### (ii) Vehicle Registration:

Initially, the user has to register information of the vehicle to be used. It consists of RFID tag which has a unique Identification number, car details such as car registration number, car model and user information such as user name contact number, email id. The user can register the vehicle in three modes i.e. normal vehicle, emergency vehicle, stolen vehicle, and a vip vehicle. The mechanism for an emergency vehicle and a vip vehicle works in a similar fashion. Once the vehicle and its type has been registered with the system, the user has to deposit a fixed amount. This amount is used for further actions. This information can be changed later as and when required.

### (iii) Ambulance Detection:

Ambulance and fire brigade is categorized under emergency vehicles. These vehicles have certain deadlines to be met on time. If they fail to do so, the outcome may be fatal. Mostly it happens that these emergency vehicles get stuck in traffic due to current traffic signals. This may yield not very good outputs if they fail to meet their deadline. If the vehicle to be registered is an emergency type of vehicle, the RFID number of that vehicle is prioritized to high. If this unique registered number is detected at any particular traffic signal, automatically that signal turns to green for a fixed amount of time and simultaneously the opposite signal turns red. This ensures safe passage of emergency vehicles. The fixed time is changeable can be changed by the administrator only.

### (iv) Stolen Vehicle Detection:

In ITS, a vehicle which is stolen can be detected. This advantage is absent in current traffic signal systems. Once the vehicle has been stolen, the user has to report to the administrator. The RFID number of that vehicle is then updated from normal vehicle to stolen vehicle. If this number is detected at the signal, the appropriate authorities are informed and the vehicle can be detected with very much ease. Once the vehicle has been detected, the administrator changes the status of the car from stolen to normal vehicle.

### (v) Android app:

A user has a provision to access the data from the android app. The first step for the user after downloading the mobile app is to register the car as mentioned earlier. Once the user has registered, he/she can log in to the app with a username and password. This should be kept confidential. After logging in, the user can have a view on the density of the traffic present on the desired signal. The traffic density shown by google is in terms of high or low. This information is just not sufficient to know the traffic information. Highness or lowness of traffic may vary from person to person. In ITS, the users can view exact number of vehicles in the traffic which makes it easy for the user to analyze the density of traffic.

### (vi) Rule breaking detection:

Initially, the amount which is deposited in each user account is used in this module. Whenever any user breaks a signal, or carries an invalid license the ITS system automatically deducts some amount from that users account.

A notification message is sent to the user by a free sms website. To receive the message the user should have an active message plan and the sim card which is registered should not be on DND mode.

### Future scope:

- In India, not all the people have a same mindset. It varies from person to person and that too drastically. It can be seen on many traffic signals that people move when there are 2-3 seconds left to turn the signal green. This has led to accidents as well. Hence to avoid this, a mechanism can be created in which spike stripes can be used. These spike stripes should be buried in the road. As soon as the signal turns red, these stripes should come up to block the way of the vehicles. It should go down only when the signal turns green. This may provide a safety measure to ensure that no vehicle can move if the signal is red.
- Instead of using a free sms website a gsm module can be used to send notification system to the user. A user can get notifications even if the phone is on DND mode.

### Conclusion:

- ITS provides remarkable features which the current system lacks. Hence this can be the only way to enhance the flow of traffic.
- Development of smart city is one of the major projects carried out in the country. Traffic is the most highlighting factor of a city which has to be managed well. ITS proves to be the best and only solution which can contribute a big helping hand in development of a smart city.
- The Emergency vehicles also can satisfy the requirements which are defined to them. Obstructions in their way can be reduced drastically.
- Also the work of police department to detect a stolen vehicle is partially done using the stolen vehicle detection. This can help police department also to find out the location of the stolen vehicle.

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