

## Intelligent Speed Violation Detection System

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### ABSTRACT

Traffic increased day by day due to ever growing technologies and Population. Now days, Roads are full with the vehicles not in day time but also in night time. If speed of the automobile is beyond the expected speed limit it's called speed violation. Speed Violation is a major reason behind accidents. The violator's vehicles are not tracked by human eyes. So, various systems have been developed for detecting speed violator vehicles. But these systems are suffered from the problems that occur due to bad weather condition and bad light condition. In this paper we introduced a system, based on RFID technology, which is capable of work properly even in bad lighting and weather conditions.

**Keyword:** Automobile, Violator Vehicles, RFID Technology, Speed Violation

### INTRODUCTION

Traffic management is the critical issue of the road. With growth in traffic, there is occurrence of bundle of problems too; these problems include traffic jams, accidents and traffic rule violation at the heavy traffic signals. The expected increase of cars and SUVs from 2005 to 2035 is 13 times (35.8 million to 236.4 million vehicles), while two wheelers are expected to increase about 6.6 times (35.8 million to 236.4 million vehicles).[1] Vehicle speed detection is very important for observing speed limitation law and it also demonstrates traffic condition. There are instances where the speed of the automobile is beyond the expected speed limit or the driver does not obey the traffic rules. The speed of the vehicle

more than defined limit is dangerous which makes the chances of accidents.

An increase in average speed is directly related to both the likelihood of a crash occurring and to the severity of crash consequences. A 5% increase in average speed leads to an approximately 10% increase in crashes that cause injuries and a 20% increase in fatal Crashes. [2] Intelligent transportation systems are becoming more important due to their advantages of saving lives, money, and time. Acquiring traffic information, such as lane width traffic volume (the number of travelling vehicles per time period through a position in a lane), traffic density (the number of total vehicles in a given area at a given time) and vehicle speed, these are the key part of intelligent transportation systems, and such information is used to manage and control traffic. It focuses on vehicle speed since reducing speed can help to reduce accidents.[3]

### RFID TECHNOLOGY

In the last years, RFID technology has been gradually incorporated to commercial transportation systems. A well known example is the RFID-based highway toll collection systems which are now routinely employed in many countries, like the Telepass system in Italy or the Auto pass system in Norway. Other uses include monitoring systems to avoid vehicle theft [5], access control to car parking or private areas [6], and embedding of RFID tags in license plates with specially coded IDs for automatic vehicle detection and identification [7]. Radio Frequency Identification (RFID) technology shows a continuous growth in various application fields, like logistics, medical science, security, access control etc. The RFID system

is a three component system consisting of: tag, reader and database. The access control, specifically, is detection of IDs entry to or exit from the range area of the RFID reader.[2]The RFID technology is a means of gathering data about a certain item without the need of touching or seeing the data carrier, through the use of inductive coupling or electromagnetic waves. The data carrier is a microchip attached to an antenna (together called transponder or tag), the latter enabling the chip to transmit information to a reader (or transceiver) within a given range, which can forward the information to a host computer. The middleware (software for reading and writing tags) and the tag can be enhanced by data encryption for security-critical application at an extra cost, and anti-collision algorithms may be implemented for the tags if several of them are to be read simultaneously. [8]An RFID system consists in a set of emitters or tags which, periodically or upon interrogation, transmit a short digital radiofrequency message containing an identification code (unique to each tag) as well as some data stored in the tag's memory. These data can be obtained remotely by a computer equipped with an RFID reader.

The main advantage of RFID systems—with respect to other RF technologies, which could be used for infrastructure-to-vehicle (I2V) communications — is its low cost and minimum infrastructure maintenance, which results in a high scalability and easy deployment of the infrastructure.[9]

#### RELATED WORK

Many works and efforts have been done for vehicle detection and speed measurements. Ferrier et al. (1994) introduced vehicle detection based on frame difference, un-calibrated camera (Pumrin and Dailey, 2002), motion trajectories (Melo et al., 2006), geometric al optics (Jianping et al., 2009), and digital aerial images (Fumio et al., 2008; Wen and Fumio, 2009) are already introduced. Also, Huei-Yung and Kun-Jhih (2004) used blur images to find out the

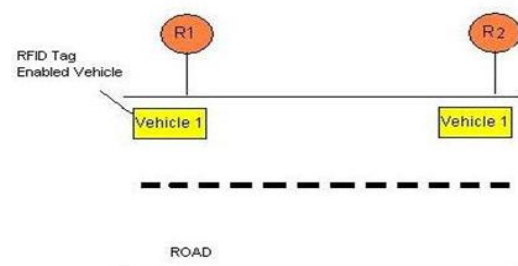
vehicle speed and Pumrin and Dailey (2002) utilized camera motion detection for automated speed measurements. Shisong et al. (2006) took advantage of feature point tracking for vehicle speed measurements.[4]

Vision-based vehicle speed measurement (VSM) is one of the most convenient methods available in intelligent transportation systems. A new algorithm for estimating individual vehicle speed based on two consecutive images captured from a traffic safety camera system. Its principles are first, both images are transformed from the image plane to the 3D world coordinates based on the calibrated camera parameters. Second, the difference of the two transformed images is calculated, resulting in the background being eliminated and vehicles in the two images are mapped onto one image. Finally, a block feature of the vehicle closest to the ground is matched to estimate vehicle travel distance and speed.[3]

The other techniques for vehicle speed measurement technologies are radar, speed measurement by Laser, Speed Measurement by Lights, Speed measurement through technographs etc.[10]

#### PROPOSED WORK

The Proposed System uses the Radio frequency identification technology. The Proposed system used the 2 RFID Readers for reading the RFID Tag enable vehicle. The RFID Reader mounted on the Road within the few distance. The RFID tag placed in the vehicle. The System used passive tags which store the vehicle information. Passive Tag obtained power from the reader.



**Figure 1. Proposed System environment**

In proposed system when tag enabled vehicle(V1) comes under in the range of Reader1 (R1) the vehicle information read by the R1 from the vehicle tag, the entry of the vehicle stored in the database with time, date and vehicle number. After this the vehicle travelled from R1 to R2. When vehicle comes in the range of Reader (R2) the entry about vehicle store again in database. After this system calculates the difference between entries of vehicle form both readers. The time is calculated by time taken for travelled by vehicle from R1 to R2 ( $R2, T - R1, T$ ). Speed is calculated by Distance/Time. Distance between the Readers predefined. After speed calculation, the current speed is compare with existing speed limit if the current vehicle speed is more than given vehicle limit it declared as "Speed Violator". In the proposed system vehicles are divided in different categories like light weight vehicle, heavy weight vehicle etc. According to vehicle type the speed limit is compared or checked.

#### ALGORITHM

Step1 : Pick the reading of two Reader (R1 & R2) of the vehicle.

Step 2 : Calculate the difference between the reading of R1 & R2 and Store it into variable Time.

$$\text{Time} = R2VN - R1VN$$

Step 3 : Next, Calculate the speed

$$\text{Speed} = \text{Distance}/\text{Time}$$

(Distance is predefined)

Step 4 : Extract the type of the vehicle from vehicle number (VN) and store it into a variable TYPE VEHICLE

Step 5 : Now compare the vehicle type with vehicle category after this according to category compare the current speed with given speed.

Step 6 : If the current speed greater then speed limit then vehicle declared as Violator. The information about violator vehicle is stored in the database.

Step 7 : End

## CONCLUSION

The proposed system is based on RFID. With the help of RFID reader and tag communication, proposed system can track the violator vehicles even in bad weather conditions and bad lighting conditions. The multiple vehicles can be detected at same time with the help of proposed system.

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