

Real Time Vehicle Vision and Road Detection using Radio Frequency Identification

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Abstract — In this paper, Radio Frequency Identification (RFID) technology is used in order to identify vehicles. RFID technology that will detect road accidents and provide details about the vehicle involved in the accident. Reader is used to find the violation of the signal. Each tag of data will be stored in main memory (database) [1]. This unique data helps in determining the violator of the signal. Our system mainly focuses on solving this traffic light violation discovery by using RFID. We can incorporate RFID tag on every vehicle which can read by RFID reader. RFID reader is integrated on signal. This RFID reader always check for red light violation, if any vehicle disobey the rule of traffic signal then RFID reader read the RFID tag number of that vehicle and send all information to the control section. After that, usual fine bill will be generated and is send to the person who violates the rule. Corruption is also reduced in traffic system. This is achieved by decision making algorithm which identifies traffic violation. Implementation of this system is possible in the shortest time and it has a better function.

Keywords — Radio Frequency Identification; Radio Frequency Reader; Radio Frequency Tag.

1. Introduction

In this paper, Radio Frequency Identification (RFID) vehicle tags offers accurate and secure way to allow access into various locations. RFID is a technology that incorporates the use of electrostatic assortment in the radio frequency (RF) portion of the electromagnetic continuum to uniquely identify an object, animal, or person. RFID is only one abundant technologies grouped under the term regular Identification (Auto ID) such as bar code, magnetic links, optical character recognition, voice recognition, touch memory, smart cards, biometrics and etc. Nowadays road accidents are increasing in a large scale. In most cases, we can save the lives of the injured people if they are brought into a hospital at the right time. But some people never care about this in their busy life, because they have to face so many issues regarding it. In such cases we can use a new technology that will detect road accidents and provide details about the vehicle mixed up with accident. The technology also provides visuals about the accident vehicle and people injured in the accident. This helps the

authority to get a clear idea about what has happened and how serious the situation is. RFID is an automatic identification method, relying on storing and remotely retrieves data using devices called RFID tags [8]. The technology needs the assistance of an RFID reader and RFID tag.

An RFID tag is an object used for identification and tracking. This can be done by using radio waves. Some tags can be read several meters away ahead of the line of sight of the reader. An RFID tag is an object that can be built into a product; here it is the vehicles for the idea of identification and tracking using radio waves. Today, red light violation is one of the most common and severe problem which results in the collision of millions of vehicles. A red light violation occur when a vehicle try to cross the intersection at the red traffic light. So to give the penalty to the drivers of these vehicles, we must identify the vehicle that violates the traffic light signals. RFID is a budding technology that uses wireless radio waves to identify objects from a distance. RFID enable the user to capture real time information while rapid moving and huge product flows with the aim of achieving a high degree of efficiency and assuring high quality. RFID is an identification tool or tracking tool which consists of RFID tag, RFID reader and backend Database.

RFID technology depends on the communication between the RFID tags and RFID readers. As a result, the communication between the main components of the system i.e. tags and reader is established. The reader can act upon certain operations on the tags such as reading the tag's identifier number. We can now install them in our car which won't get lost. Also, computer makes it much faster to access data in a convenient form and within a short period of time. Thus, things become easier and faster to access. RFID technology offers an easy way to maintain a huge manufacturing process.

The system comprises of five components, RFID Tags, RFID Reader, Wireless Network, Server and Data base which are illustrated in figure1. This is compared to other systems which are generally based on sensors or binocular implementations is that it could be enabled in any place. This system is also used for special vehicles like fire fighters cars, ambulances, police cars and VIP cars. Since the system is centralized, no violations can occur and in case of any violations the data is read by RFID and if the driver's violation it will be recorded.



Fig.1: Real time vehicle vision and road detection -Radio frequency identification

2. Existing System

Fuzzy techniques, neural network [2], artificial vision, Global Positioning System (GPS) devices and webcam, and Radar are some of the technologies used previously. There are varieties of technologies used to detect the violation of traffic.

2.1. Disadvantages of Existing System

- Installation problems may occur.
- Cost is high.

3. Proposed System

Our system is based on the principle of using RFID technology to track the vehicles [3]. The data obtained is used to control and manage the traffic. By the help of sensor detectors, tag reader will read and send the information to the control section that violates the signals.

3.1. Advantages

- Reduce the rate of accident.
- Reduce workload of traffic police.
- This system is simpler and quicker in any kind of weather condition.
- The equipment used is less in amount.
- It is easier to understand .

4. Methodology

The Decision making Algorithm is used in this model, which is explained below.

4.1. Observing and Collecting Data

Observing and collecting data is the most basic part of the system. We have devised a method for creating a system and for controlling road traffic. Our system is based on the principle of using RFID technology to track the

vehicles and using the data obtained from that, we can control and manage the traffic.

RFID Reader receives data from RFID tags and then transfers to the control section via wireless. In control section the data will be examined and decision making takes place and finally all data will be saved.

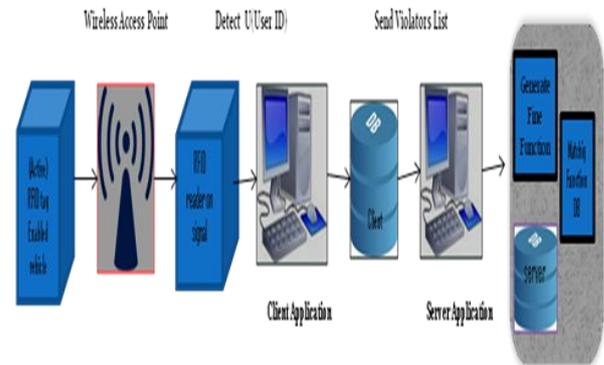


Fig.2: System architecture

These RFID readers always check for red light violation, RFID reader reads the tag on the vehicle. Reader sends tag id to client system and storing tag id in client system. If any violation occurs the reader will send the tag id to the server. This leads to the generation of fine amount and sending message to violator [7][8].

In our system, we propose to design a smart and fully automatic system that will detect the vehicle in real time, and subsequently manage it efficiently to ensure smooth traffic flow with the use of active RFID devices [4]. When the vehicle passes near to a RFID reader, it detect the tag which contains the details about the owner, and the vehicle. This helps in identifying the location of vehicle [5].

5. Implementation

For the implementation of this model we used Java programming language. Let S be a complete system, $S = \{I, V, U\}$. Where, U=set of stored Unique Identifier (UID) information, I=set of vehicle, V=set of violator, $U = \{User1, User2, \dots, User n\}$, $E = \{Emergency Vehicles\}$, $NE = \{Non Emergency Vehicles\}$.

RFID reader scans U (User ID) from vehicle [6]. Reader sends U to client system to Store it. Then only the violators list will be send to the server system. U starts from 0, where emergency vehicles information only stored as no violation. For Non Emergency vehicles, generation of fine amount and sending message to violator and if he/she does not pay fine, further actions will be taken on violator. Also implementing this system is simpler and quicker in any kind unlike system using binocular and the equipment used is less in amount. This working can be explained by the following flowchart.

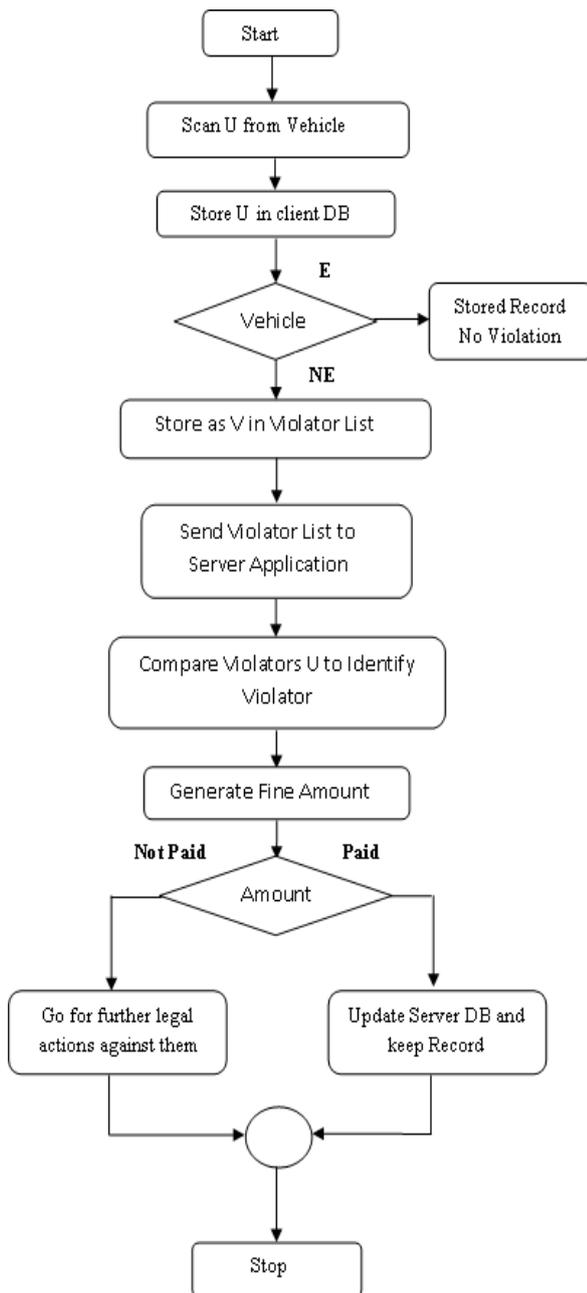


Fig.3: Flow of System

7. Conclusion

In this paper, the basic concepts of RFID technology are used, which is then used for identify the signal violators and exhausting them. The main objective of the paper

is to identify the violators and improve the security in communication between RFID tag and RFID reader. Our system is based on the principle of RFID technology to track the vehicles and using the data obtained from that to control and manage the traffic. There are many existing methods used to manage the traffic and many more which are currently being used. Though this field of study will always have a future scope, because of the continuous increase in the number of cars being driven on the street and the uncertainty of events that can cause traffic.

8. Future Enhancement

The message transmission in binary representation is to reduce transmission time and bandwidth will be the next problem to be solved. At the same time, the large data stored in the system can be mine to find useful information to offer help to other functional departments, such as transportation department and police [8]. For which we are introduce a new perception that every vehicle should have Radio Frequency (RF) device built-in with the vehicle. If any inequality found the system will automatically send alerts to the precise department.

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