



Puranmal Lahoti Government Polytechnic

Latur (Maharashtra)

A PROJECT REPORT

ON

“TRAFFIC CONTROL SYSTEM”

SUBMITTED TO THE MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION (MSBTE)
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DIPLOMA IN INFORMATION TECHNOLOGY

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CERTIFICATE

This is to certify that the Project Report entitled

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is a bonafide work carried out under the supervision of Prof.Chaitanya M. M and it is submitted towards the partial fulfilment of the requirement of Maharashtra State Board of Technical Education (MSBTE) for the award of the Diploma In DEPARTMENT OF INFORMATION TECHNOLOGY Project.

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ABSTRACT

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 manage Proposed system we are using RFID/NFC tag for tracking vehicles whose breaking signal, track heavy vehicles in city at day time.

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 inter-connection methods. The proposed system avoiding traffic congestion, minimizes traffic rates and track vehicle whose breaking rules

Keywords: Traffic Automation Rule Voilation Detection, RFID, Cloud,Police Automation

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Chapter 1

INTRODUCTION

1.1 RFID Introduction

Radio-frequency identification (RFID) is the wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. An RFID system comprises of three components: an antenna, transceiver (often combined into one reader) and a transponder (the tag). The RFID component on the tags has two parts: a microchip that stores and processes information, and an antenna to receive and transmit a signal

To read the information encoded on a tag, a two- way radio transmitter-receiver called a reader emits a signal to the tag using an antenna. The tag responds with the information written in its memory bank. The reader will then transmit the read results to an RFID computer program.

RFID Transponder

RFID Tags

Tag Classifications RFID tags are classified into three categories i. Active Tag Has its own battery that is used to broadcast signals over great distances. Usually bigger in size and capable of carrying more information

ii. Passive Tag Inbuilt power source. The signal from the RFID reader creates an electromagnetic field that powers the tag. Much cheaper.

iii. Semi-Passive Tags Equipped with an onboard battery that drives the chip's circuitry but power for communication of the signal is derived from the reader's electromagnetic field as in the case of passive tags.

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 inter-connection methods. The proposed system avoiding traffic congestion, minimizes traffic

rates and track vehicle whose breaking rules.

1.2 Problem Statement :

”TRAFFIC CONTROL SYSTEM”

- Objectives
- 1]Automatic detection of signal jumping.
- 2]Automatic detection of heavy vehicles in city premises during daytime.

Chapter 2

LITERATURE SURVEY

2.1 Reference Papers :

Now a days, police are using mobile applications to collect the fines but still the system is not fully automatic. People now a days started using wallets to pay fines generated by traffic police instead of cash. Many signals are installed with CCTV cameras to capture live footage to generate fines but that system is not much accurate. An efficient traffic management techniques are needed to reduce reducing accidents, traffic jam, waiting and traveling times, save fuel and money. In order to alleviate the problem, a large number of methods and approaches have been suggested in the literature. It includes rule based learning to the modern fuzzy and neural network approaches. The various solutions to the traffic control problems suggested in the literature are presented, along with their merits and demerits.

[1] In 2015, Delhi declared 1,622 deaths due to delay in response time for road accidents. Red signal violations have also caused major accidents and deaths in the past. Another problem due to congestion is fuel wastage. A survey conducted by IIM stated that India loses Rs. 60,000 crore due to traffic congestion every year

[2]. Air pollution due to congested traffic is multiple times higher compared to air pollution in case of smooth flowing traffic. At trip speeds of up to 20 kmph, carbon dioxide emissions were about four times as much as when the average speed was about 60 kmph [3]. Traffic congestion also leads to delays, which may result in late arrival for employment, meetings and education resulting in lost business, disciplinary action or other personal losses. The chances of collision are higher due to tight spacing of vehicles. All these problems extensively contribute to traffic related issues.

[3] To address all these issues, a dynamic real-time traffic management system based on RFID and analytics has been proposed. One of the main goals of the system is smooth traffic flow at all times. This means that traffic congestion is to be prevented before it occurs, rather than managing it after it occurs. Using analytics, if traffic congestion is predicted even after density based timer control, dashboards are used to display messages for mandatory deviation of traffic at the previous junctions. This ensures that traffic congestion is avoided even before it occurs. Passage of emergency vehicles can be assured by turning on the green signal for the lane where an emergency vehicle is detected. The capability of the system stretches beyond traffic management. RFID tags associated with each vehicle can store data such as vehicle number and owner's details. Vehicle breakdowns, road accidents and traffic violations such as red signal jumps can be immediately detected and notified to emergency services and the traffic police department respectively. RFID tags and scanners are highly cost effective compared to cameras and sensors.

[4] In the last couple of decades, number of vehicles has been increased drastically. Hence it has become very difficult to keep track of each and every vehicle for the purpose of traffic management and the law enforcement. Use of Automation number Plate Recognition is increasingly now days for maintaining traffic activities and as similar to the method of automatic electronic toll collection. In the past, from the survey many techniques and algorithms have been proposed for number plate detection and recognition, each technique having its own advantages and disadvantages. The fundamental step in number plate detection is localization of a number plate.

[5] A traffic violation is becoming more serious in many countries and that is difficult prosecuted the offender by the police force due to the insurmountable traffic situation. A new solution is that using the technique of motion detection with combining the RFID technology, which uses electromagnetic fields to automatically identify and track tags attached to objects, to overcome this challenge and due to the rapid development of Intelligent Transportation System (ITS). It has been providing a various methods for monitoring vehicle detection, reverse driving detection, vehicle counting, speed estimation, congestion detection and many traffic conditions. The most important issue of ITS is that how the system can detect accurately and know the traffic situation at all times. As a result, there are many sensors and related systems that have been implemented in the detection of traffic conditions. In consideration of the availability of inexpensive hardware and the developable software which can be applied to various functions, computer vision became one of the most promising alternatives to detect the traffic situation .

[6] Camera sensors used in computer vision can provide more information than conventional sensors that currently have been widely used [2][3]. And in the past 10 years, object recognition and categorization have become well developed. In spite of this, it also has two limitations and weaknesses in object detection

and recognition, such as (a) same object appear at the same time on the monitor, (b) cannot be applied to a moving camera for detecting the objects (vehicles, pedestrian, etc), therefore, with combining the RFID technology for recognize the specific object in traffic violation would be consider as a very effective way for object recognition [4][5][6].

[7]This paper proposes the method of background subtraction for detection and tracking the vehicles and combining with RFID technology to recognize the vehicle specifically. Since vehicles are a moving object, and sometimes it is very difficult for detect a vehicle correctly, because it has the various situations on the road during all day, such as the change of brightness, the flow-rate of the vehicles in the road and shadow of the moving objects. There are many methods on moving objects detection, and background subtraction is more a primary way for it. Background subtraction is very simple, but it is very sensitive to the change of illumination. Thus, it will affect the results of the detection, due to this reason, a method of background subtraction on objects detection is presented in this paper. Meanwhile, it is used by the method of background subtraction with for detection and tracking the vehicles. Moreover, RFID technology has been used in the condition of recognizing the vehicle since RFID technology can provide wireless communication between reader and tags which are mounted to the target objects. The RFID technology has the advantages of multi-object recognition and long transmission range which is very suitable for vehicles recognition in the complex traffic condition

[8]The proposed Automatic Number Plate Recognition (ANPR) System is based on an image processing technology. The proposed system can be mainly used to monitor road traffic activities such as the identification of vehicle during traffic violations such as speed of vehicle and to detect at the street traffic signals lane violation. And thereby can be traced every vehicle for traffic rule violation and can provide the information to the concern authority to take further effective action, so we can have smooth traffic flow and also we can avoid accidents occurring on the traffic junction. This system can also be used to assist the authorities in identifying for any stolen vehicle. The proposed system first detects for any vehicle which violates traffic rule and then captures the vehicle image.

[9] From the captured image using image segmentation technique the vehicle number plate region will be extracted. And the technique used for the character recognition on number plate is Optical character recognition. The system is implemented and simulated using Matlab. Next we have feedback system i.e., the vehicle number which is extracted using the proposed ANPR algorithm from PC which is then given to GSM modem for further SMS feedback system to the user and concern authority. The system design also involves the design and development of GUI using Matlab, to ease the user in step by step recognizing the characters and numbers from the vehicle license plate and displaying on the desktop GUI screen.

Chapter 3

SOFTWARE AND HARDWARE REQUIREMENTS

3.1 Project Scope

- • Fine collection from account.
- • Signal Jump detection
- • Heavy Vehicle detection at day time
- • Notification to police application
- • SMS to user about fine deduction from account

3.2 Design And Implementation Constraints

- The design of system must be user friendly for stakeholders to use it with an ease. Implementation should be done in a way that when there is a need of improvement it is easy to understand and modify. The code should be well commented.

3.3 System Features

- Read the with chip RFID tag
- Description and Priority Most important function of the system. Here with chip tag is read by using RFID reader and UIN communicated to the server for further calculations.
- Stimulus/Response Sequences Reader will give input to the system of UIN.
- Functional Requirements Reader must be connected to the computer using wireless connection.

- Fine Generation
- Description and Priority Top priority function which takes care of generating fine in case of violation of traffic rule by user.
- Stimulus/Response Sequences Input given is UIN and at output we get generated fine if rule is broke by user.
- Functional Requirements System must be in working condition to process the UIN.
- Road widening prediction
- Description and Priority We will provide traffic data to government based on which they can take decision of road widening
- Stimulus/Response Sequences Count of number of tags scan will be given as input and in output will show total no of vehicles passed by a particular signal.
- It can avoid the delay caused by traffic via RFID technology

3.4 External Interface Requirements

3.4.1 User interface requirements

- The user interface for the software shall be compatible to any operating system Such as Windows, Ubuntu etc. by which user can access to the system. The user interface is implemented using software package like Java, Java script, HTML etc. .

3.4.2 Hardware Interfaces

- All the RFID readers must be connected to network using wireless connection constantly.
- The RFID Readers And Wifi-Module is connected through 5v power supply.

3.4.3 Software Interfaces

- Web App for users.
- Web App for RTO.

3.5 Non-Functional Requirements

3.5.1 Performance Requirements

System should not much time consuming and perform without any abnormal failure.

3.5.2 Safety Requirements

System should not do any damage to the environment and must be safe to use for all of its stakeholders. So while designing the system it should be designed by keeping all the safety norms in consideration.

3.5.3 Security Requirements

The system must be designed by following three tier architecture and with encrypted data so that hacker cannot hack the database of the system and system should get secured.

Chapter 4

PROJECT PLAN

4.1 SDLC

- The Waterfall Model
- Waterfall model is also called linear sequential model or classic life cycle model. In our proposed system we need to follow a particular sequence that's why we are using waterfall model in proposed system. This waterfall model paradigm begins at system level and goes through analysis, design, coding and maintenance. Different stages of waterfall model:
 - 1. Communication: Project development process starts with communication between group members. We need to specify all the requirements.
 - 2. Planning: It includes complete estimation and scheduling of project.
 - 3. Modeling: It includes detail requirement analysis and project design (algorithm and flowchart).
 - 4. Construction: a. Coding b. Testing
 - 5. Deployment: It includes software delivery, support and feedback from customer.
- Advantages: 1. This model is very easy to understand and use. 2. In this approach, each phase is processed and completed at one time and thus avoids phase overlapping. 3. It is very easy to manage since all the requirements are very well understood in the beginning itself.
- Disadvantage: 1. According to this model customer must state all his requirements at beginning stage of development which is difficult for the customer.

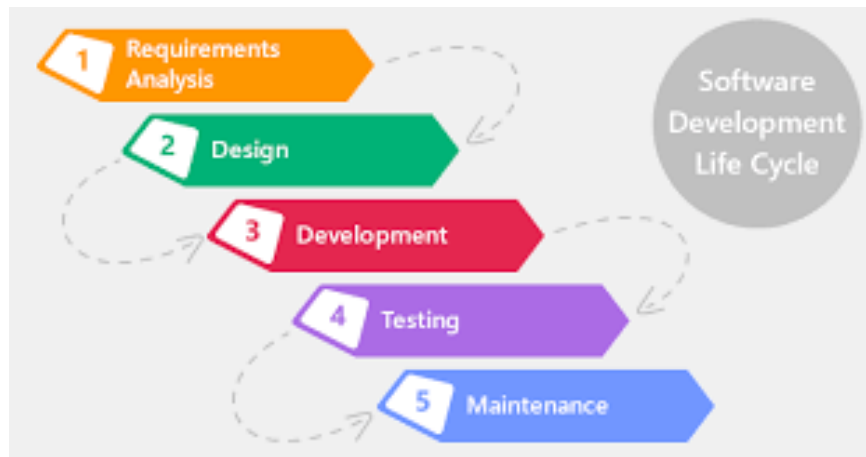


Figure 4.1: Software Development Life Cycle

Chapter 5

PROPOSED SYSTEM

5.1 Problem Statement

”Traffic Control System”

5.2 Objectives

- • Automatic detection of signal jumping.
- • Automatic detection of heavy vehicles in city premises during daytime.
- • E-Challan for traffic rule violaton.
- • Detect area facing traffic congestion problem.

Chapter 6

TECHNICAL SPECIFICATIONS

6.1 Advantages

- Increase efficiency In Traffic Automation.
- Fast access .
- Saves time.
- Results into less traffic rule violation.

6.2 Disadvantages

- Hardware support required at each signal.
- Maintenance of System requires much cost.

6.3 Applications

- Real Time Traffic monitoring : Physical parameters Will not to be fulfilled to monitor all the traffic but this Automated system will do the most of work easily.

Chapter 7

CONCLUSION

The developed application is easy to use, economical and does not require any special training. This project simplifies the police work by automation. This project will stop generation of cash and will increase digital payments. The system shows promising results on automatic detection, since the detection of the tag identification is more precise, reliable and efficient in active RFID, leading to implement corrective actions. The experiments are done using four test vehicles. The frequency of RFID reader is 125 Hz and the range of the RFID reader is 1 meter. In real time environment, if the average road lane is 3.5m, then approximately two 125 Hz readers are required for one road lane. Many vehicles may be moving nearby and possibly blocking or attenuating some of the RFID signals, especially with large vehicles like trucks. A possible solution is the use of RFID readers of higher frequency range since their reading range is high.

Chapter 8

REFERENCES

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- [1] Traffic Congestion in Bangalore-A Rising Concern. [Online]. Available: [http://www. Common floor. com/ guide/ traffic- congestion -in -Bangalore-arising- concern- 272 38. html](http://www.Common floor.com/ guide/ traffic- congestion -in -Bangalore-arising- concern- 272 38. html), accessed 2013.
- [2] Shruthi K R and Vinodha K, "Priority Based Traffic Lights Controller Using Wireless Sensor Networks", International Journal of Electronics Signals and Systems (IJESS) ISSN
- [3] Ms. Pallavi Choudekar, Ms. Sayanti Banarjee and Prof. M K Muju, "Real Time Traffic Light Control Using Image Processing", Pallavi Choudekar et. al./ Indian Journal of Computer Science and Engineering (IJCSE), ISSN: 0976-5166, Vol. 2 No. 1.
- [4] R. Hegde, R. R. Sali, and M. S. Indira, "RFID and GPS Based Automatic Lane Clearance System For Ambulance", Int. J. Adv. Elect. Electron.Eng, vol.2, no. 3, pp. 102-107, 2013.
- [5] Li C, "Automatic vehicle identification (AVI) system based on RFID", In Anti-Counterfeiting Security and Identification in Communication (ASID), 2010 IEEE International Conference, 2010 Jul 18, pp. 281-284.
- [6] . Zhang X, Tentzeris M, "Applications of fast-moving RFID tags in high-speed railway systems", International Journal of Engineering Business Management, 2011 Feb 1, pp:3:6.
- [7] Perez J, Seco F, Milanes V, Jimenez A, Díaz JC, De Pedro T, "An RFID-based intelligent vehicle speed controller using active traffic signals", Sensors, 2010 Jun 9, 10(6), pp: 5872-87.
- [8] Cheng-an ZT, Min-lu J, "A RFID Based Traffic Information Acquisition System and Vehicle Positioning Method", Journal of Electronics Information Technology, 2010, pp: 11-15.