

CONDUCTING TRAFFIC SURVEILLANCE FOR MOTOR VEHICLE TAXATION

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ABSTRACT

Excise taxation is the Sind government department that registers the vehicles running across Sind. This department is responsible for collecting the revenue in lieu of Token tax and annual running tax from the vehicles running under the registration number of Sind. The tax payment checking is manual, means every vehicle is stopped for snap checking. Manual verification is very tiring and cumbersome, so that every vehicle could not be checked. In developed countries this all is done through online automatic system. An online portal is introduced by the excise department on which the verification of the vehicle can be done in terms of its bogusness. But this portal and online recovery of annual tax is not concerned for the detecting of the defaulters. This research focuses on the detection of the defaulters. As the date expires the vehicle would be monitored at any toll tax stop after the recognition of the number plate data. An automatic checking method is used for detection. This method uses the technology that is called Automatic vehicle number plate recognition (AVNPR). This tool uses the image processing procedure to read the number plate numbers and characters.

KEYWORDS

AVNPR, Face recognition, Image processing.

1. INTRODUCTION

As a developing country, Pakistan is in the revolution phase. The data of every resident is not available in any central database so that if any crime occurs the person could not be detected according to his/her background history. In developed countries every person is under observation and their record is available in a centralized database. The payment of taxes and recovery of default tax payers is very difficult task. The vehicle tax is collected by the excise and taxation department. In normal routine, motorists pay their tax by visiting any excise and taxation office or in any authorized bank. The tax payment is very difficult in rural area, where the office or authorized bank is not available. It is very difficult to observe the nonpayment of this tax. The only way of paid or unpaid vehicle is to look onto the wind screen that must have a sticker. Sometimes these stickers are not available in the tax office so only the receipt is issued to the customers. The checking of every vehicle by the police sergeants is a hard job.

This research is the design of an automatic recovery and checking system that will make the process easy and reliable. The motor vehicle tax is collected from the vehicle owners on annual or bi-annual basis. But the collection is not good percentage of the intended collection, because the checking system is very old manual in nature (Yan, 2001; Hontani, & Koga, 2001). The procedure and design suggested in this document will make it easy and time saving. In this procedure, image of the number plate is captured when the vehicle stands at the toll tax plaza. The number plate numbers and characters are sent to the database of excise and taxation department for online checking. The message is sent to the mobile for the defaulter or clearance. The portal on the site of excise and taxation department Sind government is shown in Figure 1.

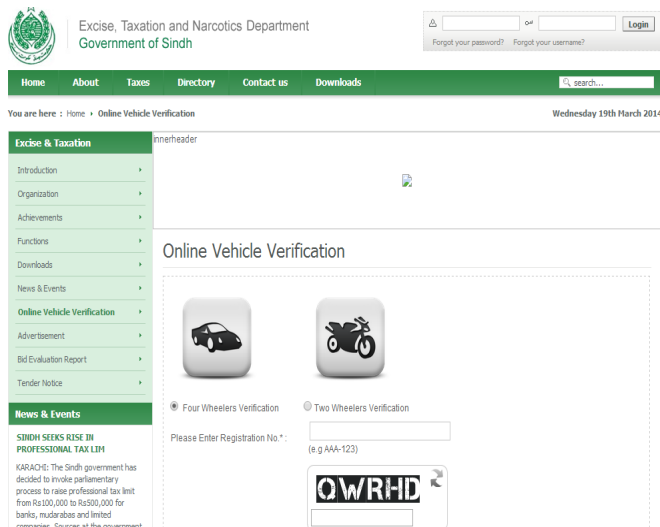


Figure 1. The screen shot of the online portal.



Figure 2. Sticker provided by the excise department fixed at wind screen.

It is very hard job to check every vehicle in hectic traffic at the toll plaza or at any other point. It may take hours to complete the job and traffic may be blocked (Mohamed Hussain, Allwyn Rajendran Zepherin, Shantha Kumar, & Abirami, 2015).



Figure 3. Manual road checking excise inspector causes traffic jam.

This research is documented to provide an automatic and technical solution of this problem. A prototype of this intelligent system is designed that uses a technology named automatic vehicle number plate recognition (AVNPR). This technology uses the image processing tool for capturing and processing the number plate fixed in front of every vehicle (Mohamed Hussain *et al.*, 2015). The characters and numbers are identified and accessed from the database of the taxation department which is available online. The capturing is done through web cameras fixed at toll plazas or at any entrance of the city. The alert signal and message are sent to the cell phone of the vehicle owner about nonpayment of the tax.

2. APPLICATIONS OF AVNPR SYSTEM

The system of detection of the number plate uses the technology of image processing (Posada-Gómez, Sandoval-González, Martínez Sibaja, Portillo- Rodríguez, & Alor-Hernández, 2011). It has unlimited application, in face recognition, monitoring of the employees in any industry, robotics systems and traffic signals etc. The problem is that how the owner of vehicle makes bound to pay the tax within the given time. The solution of this problem is documented in the literature (Figueiredo, Ribeiro, Arthur, & Conforti, 2011; Hansen, 2002) which discusses the application and integration of the state of art computers with electronic hardware and global system of mobile communication, internet and AVNPR.



Figure 4. Web Cam fixed at any center point.



Figure 5. Camera.

The vehicle tax verification software is interfaced with LABVIEW that uses the computer application software along with recognition packages.

3. HARDWARE

Radio frequency system, global system of mobile GSM m900D kit and USB port is used as shown in Figure 7 and Figure 8.



Figure 7. Hardware.

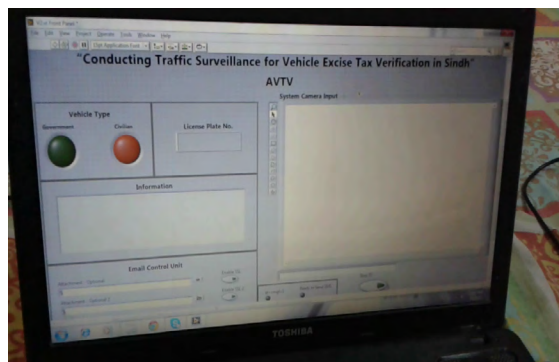


Figure 8. automatic vehicle tax verification (AVTV) software.

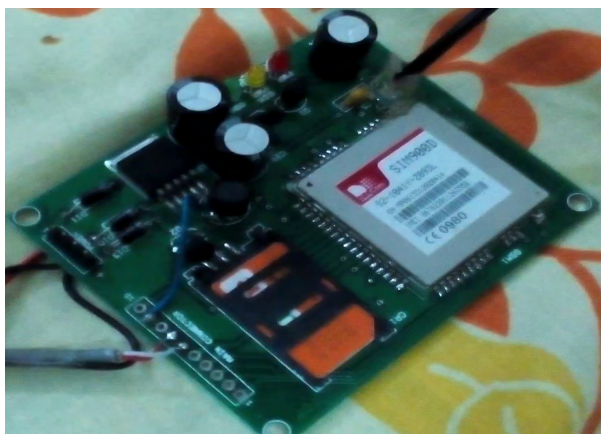


Figure 9. GSM Kit 900D.

4. DATABASE

The data collected through the prototype is checked in the database created for prototype application. The database which is used for placing the information of car owner that is his name, make and model year, tax paid and unpaid information, last paid tax and mobile number. The block diagram of whole the process or algorithm is given in Figure 9.

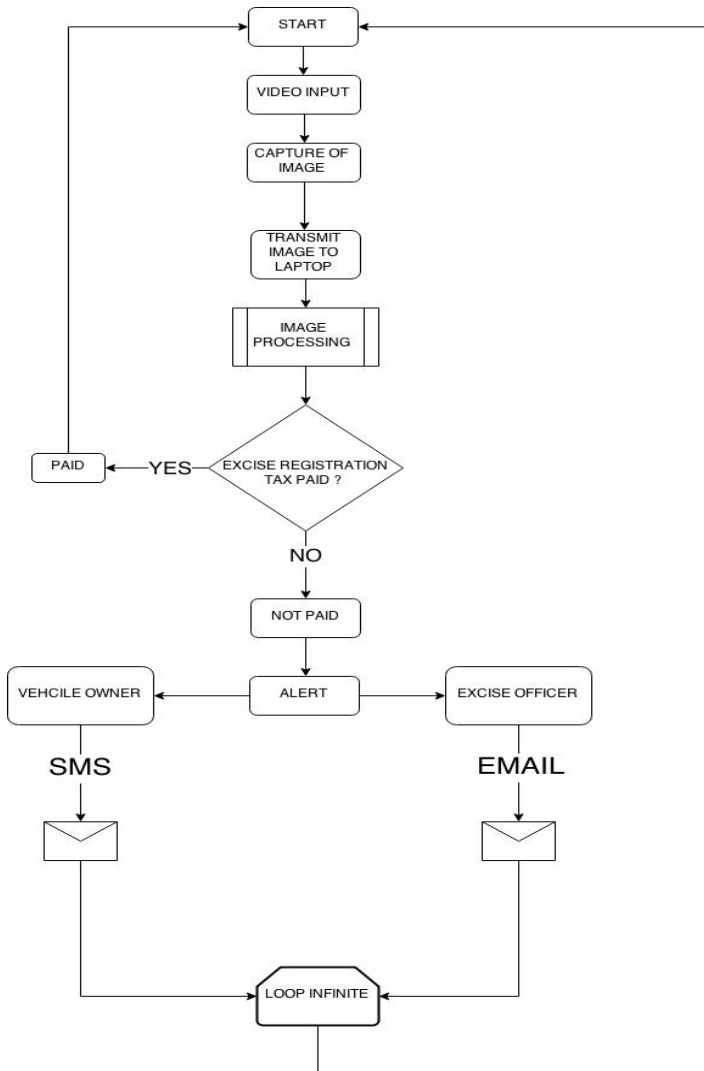


Figure 9. Block Diagram.

A hardware is designed as prototype to show whole the process. A web cam is used for capturing the image of number plate and one module of GSM kit is also fitted into the prototype. This is shown in Figure 10.



Figure 10. Hardware.

5. CONCLUSION

The Software VNPR needs the accuracy of the data and this may be difficult at a hectic road to go through whole the process starting from capturing the image of number plate, access the data base and send SMS to the cell phone. Efforts have been made by many researchers to solve this ambiguous problem. An automatic vehicle number plate recognition method is used to get the better results. Various studies conclude that the image processing is the best way to substitute the manual systems. Application of the technology to address the tax collection in Sindh excise and taxation department may generate the revenue and ultimately improve the economy of the province.

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