Automated Tollgate Payment System

Introduction

The aim of this project is to speed up tollgate reaction time by automating tollgate payment platforms so as to reduce congestion and significantly reduce toll times. Thus the creation of the Automated Tollgate Payment System (ATPS) is being designed to allow payments and facilitate automatic opening and closing of the boom.

Background

The critical situation we are facing at the moment is that current payment systems such as swipe are increasing the spread of Covid-19. Secondly, precious time is being wasted in long queues at toll gates, possibly because of network failure on different payment systems. There has been an increase in the volume of vehicle imports into Zimbabwe, causing infrastructure such as road networks and toll gates to be overwhelmed leading to congestion. Tollgates have suffered the most as the holding capacities are unable to handle the increase. Developing the current infrastructure would be a costly endeavor, thus the Automated Tollgate Payment System is being designed to reduce tollgate waiting times and subsequently reduce congestion.

Problem statement

The use of on-site EFTs at tollgates has resulted in congestion as the rate at which the transaction is processed depends solely on the network and connectivity of the mode of payment. Cash payments possess the same effect as the teller has to verify the amount presented to them. This results in the stock piling of cars as the attendant has to confirm the amount thus increasing the time taken to clear cars from the booth. In an electronic way we are fighting against the spread of the Corona Virus at toll gates and minimizing waiting time at toll gates.

Aims

1. Increase toll gate response time.
2. Maintaining social distance on gates.
3. The new system must allow a quicker way of retrieving information.
4. The new system must provide simple way of browsing information.
5. The new system must be able to maintain data consistency

Objectives

1. Facilitate user self-registration, addition of new cars to the database, modify records in case of change of ownership, delete records in case the car becomes scrap, view balance and deposit funds into the account.
2. Our setup will also allow a valid account with a lower balance to pass through – using a negative balance would automatically be charged a penalty of 10% of the amount used at the tollgate, this happens when users go for vehicle licencing.
3. Automatic opening and closing of boom gate upon payment transaction is processed after the license number is captured.

Significance of the Project

Designing and implementing the ATPS will aid in relieving congestion at toll gates without expanding the current infrastructure.

Network failures and human interception are causing long queues at tollgates. Current payment forms as swipe cards or money are increasing the spread of Covid-19 at a tremendous rate which is leading to increase in death rate. These challenges are giving us energy to automate tollgate management systems so that we will save motorist precious time at the same time stopping the spread of Covid-19 at tollgates.

Methodology

New users go onto the **ZINARA website**, where they sign up and register their vehicles. The motorist is then given an account where they deposit their money either using Eco-cash. The account is automatically loaded into the database. The car will be fully registered and be ready for tollgate transactions. A license plate recognition camera captures a vehicle's license plate and processes the image, immediately linking it with a prepaid account which is deducted the toll fee and the boom is opened. The text format number plate is then searched on the database to match the corresponding account. When the account is found with a sufficient balance, the tollgate fee deduction is made and the boom gate automatically opened for the car to proceed.

In the event of an account being depleted of funds or in the event of foreign vehicles, the motorist has to deal with the teller. The onus is on the motorist to ensure funds are available in their account. **ZINARA** are in a position to send messages to motorists informing them that the account needs to be topped up.

Scope

This project proposal specifically deals with the implementation of the above mentioned Tollgate Automated Payment System, from the motorist accessing the **ZINARA** website, registration and creation of an account and inputting the vehicle details into a database. It also explains the process at the tollgate.

The proposal does not deal with depositing money into the account, all registered vehicles in the database will be assured having sufficient amounts.

Definition of Key Variables

Conclusion

This project will be of immense assistance to the country – it is innovative and further enhances the technological improvements of the country. Less time spent at tollgates means more efficiency and faster mobility for motorists. As citizens we all have an obligation to come up with ideas to curb the spread of Covid-19, and this system is one such idea.

Chapter 2…

This chapter illustrates the current functionality of the tollgate system, coupled with the development of ATPS and how the new system will enhance the tollgate system in the country, as well as assist in the fight against the deadly corona virus.