Electronic Toll Collection System

Features: Automated vehicle identification

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Automated Vehicle Identification (AVI) is **a process that uses an advanced Radio Frequency Identification (RFID) technology to identify a vehicle as it passes the** RFID reader. Other types of AVI systems identify vehicles through license plate recognition.

First, the roadside antenna at the entrance tollgate sends a signal to the in-vehicle device with information about the entrance.

When exiting the expressway, at the exit tollgate, the in-vehicle device sends the previously received entrance information to the exit tollgate roadside antenna, the toll is calculated, and the roadside antenna sends toll information to the in-vehicle device.

Diagram

Description automatically generated

All users who want to use the ETC lane has to register themselves and once they do, they will receive a small device that looks like a card. With this card user has permission to travel using the ETC lane. Once a person enters into the highway, they should pass through a tollgate, where the signal is sent to the card, this card picks up the vehicle’s number plate and remaining balance to check whether the person can have a guaranteed journey with the amount available.

All cards should have up to 300 rupees minimum to pass through the ETC lane, once the vehicle goes through and user reaches the exit, they have to pass through another tollgate where the tollgate will extract the signal and check the vehicle category and vehicle identification. Then do the calculation and show the price deducted, remaining balance and number plate of the vehicle to the user in an LED screen located near the tollgate.

The shortcomings:

1. The main problem with this system is that it receives the signal, which is closer to the tollgate, since the receiver is located in a high place, it would receive the signal closest to it. For instance, if a vehicle like a bus was to be in position behind another vehicle like a small car, the ETC tollgate would read the card of the bus before it reads the car’s signal. Within this time the car has the probable chance to get away without paying and causing the bus to either pay twice or the conductors in highways to open the gate for free and let the bus through.
2. Vehicles have to maintain a specified distance for the system to perform at their level best. Without the specified distance between vehicles, the system may not perform at its best. It does take almost 02 seconds to properly take the reading and get the system to display the details in the LED screen for the user to see and confirm the payment.