

# Advanced System of Toll Tax Collection using 12 digit unique identity number (AADHAR) for efficient traffic management

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**Abstract-** *The main problem of heavy traffic at every Toll Booths in the city can reduced by the introduction of the RFID Based Toll Tax System, which makes the Toll Deduction at the Toll Plaza's more efficient. In this, we do the identification with the help of radio frequency. A vehicle will hold an RFID tag. This tag is nothing but unique identification number, which linked with AADHAR Card. AADHAR Card linked with bank account. The proposed RFID system transmits a unique ID code as soon as car reaches near the toll station. On receiving the code, processor checks the received code and compares it with the stored code; if the code matches, the tax amount will deducted from their prepaid balance and new balance can update and the gates open else, they remain closed disallowing the vehicle to pass. Incase if one has insufficient balance, their updated balance will be negative one. To tackle this problem, we are alarming a sound, which will alert the authority that this vehicle does not have sufficient balance and that particular vehicle can trapped. As vehicles do not have to stop in a queue, it assures time saving, fuel conservation and contributing in saving of money.*

**Keywords-** RFID (Radio-Frequency Identification) TAG; LCD / Laptop; AADHAR Card; Internet /Wi-Fi; Arduino

## I. INTRODUCTION

In the 1960s and 1970s, free flow tolling tested with fixed transponders at the undersides of the vehicles and readers, which were located under the surface of the highway [1]. Road tolls fees were traditionally for a specific access (e.g. city) or for a specific infrastructure (e.g. roads, bridges). These concepts were widely used until the last century. However, the evolution in technology made it possible to implement road-tolling policies based on different concepts. The different charging concepts are designed to suit different requirements regarding purpose of the charge, charging policy, the network to the charge, tariff class differentiation etc. [2]

## II. RFID AND AADHAAR CARD

### A. RFID

Radio-frequency identification (RFID) uses electromagnetic fields automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source such as a battery and may operate at hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture (AIDC) [3].

### B. RFID TAG

A radio-frequency identification system uses tags, or labels attached to the objects. Two-way radio transmitter-receivers called interrogators or readers send a signal to the tag and read its response. RFID tags can be either passive, active or battery-assisted passive. An active tag has an on-board battery and periodically transmits its ID signal. A passive tag is cheaper and smaller because it has no battery; instead, the tag uses the radio energy transmitted by the reader.

### C. RFID READER

The type of tag and reader can classify RFID systems. A Passive Reader Active Tag (PRAT) system has a passive reader which only receives radio signals from active tags (battery operated, transmit only). The reception range of a PRAT system reader can adjusted from 1–2,000 feet (0–600 m), allowing flexibility in applications such as asset protection and supervision. An Active Reader Passive Tag (ARPT) system has an active reader, which transmits interrogator signals and receives authentication replies from passive tags. An Active Reader Active Tag (ARAT) system uses active tags awoken with an interrogator signal from the active reader. A variation of this system could also use a Battery-Assisted Passive (BAP) tag, which acts like a passive tag but has a small battery to power the tag's return reporting signal.

### D. AADHAAR CARD

AADHAAR is a 12-digit unique-identity number issued to an Indian resident based on their biometric and demographic data. The data is collect by "Unique Identification Authority of India (UIDAI)", a central government agency of India, and stored into a central database.[4][5][6] It is considered the world's largest national identification number project.[7][8]

### III. RESEARCH METHODOLOGY

#### A. Proposed System:

The main operations are as follows:

It is require to install hardware equipment at each highway toll station namely, reader, controller, data transmission unit, bank payment gateway and other facilities in the control room of toll station. Installing structure for mounting of reader mechanism and installing alarms and other devices is to realize automatically that the tag is pass in the region of the magnetic field produced by the RFID module and a beep sound is produce signalling when detection. Each vehicle will provided with an RFID tag containing a unique ID. This tag will continuously emit RF signals. When the vehicle will reach at the tollbooth, the RF receiver will detect these RF signals. The signals were amplify and were pass to microcontroller. This microcontroller will display the id on a displaying device, which will provided in tool-station.

#### B. Block Diagram:

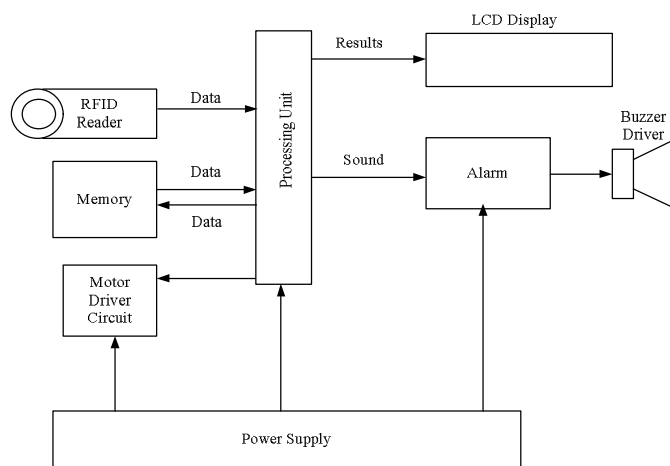


Figure 1. System Block Diagram[9]

Flow of System:-

- Vehicle comes to a toll plaza.
- System will check the details of vehicle.
- There will be an automatic payment made by the system with the registered details.

When the vehicle is going to enter into the toll plaza, the first aim is to validate the vehicle for its authenticity. For that purpose, it has to pass through the IR Transmitter - Receiver gate. Then we have here the RFID system. The system will automatically detect a tag.

#### C. Proposed Algorithm:

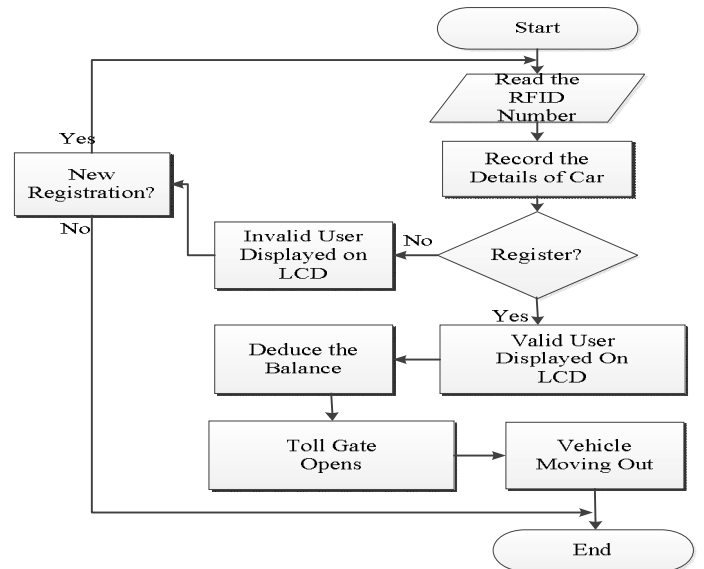


Figure 2. Detail Flow work[9]

### III. SIMULATION

There are main steps for simulation.

- Step 1. Create Programming in Arduino software
- Step 2. Design Schematic in Proteus software
- Step 3. Check the solution
- Step 4. After checking solution in Proteus software, if all the components are working together then go for hardware implementation.

Schematic of RFID Tag with L293D motor in Proteus shown in below figure.

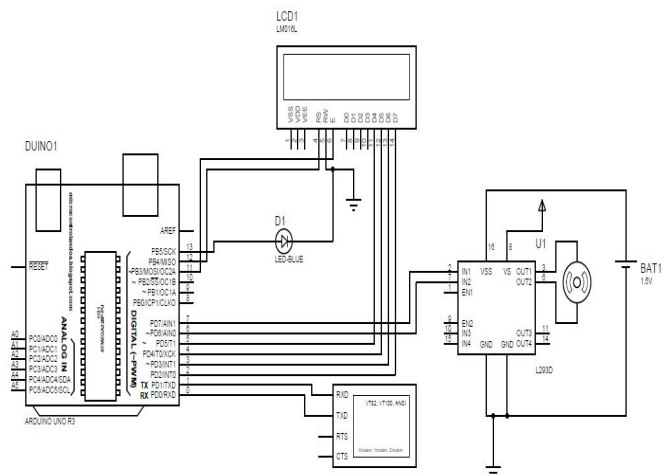


Figure 3. Schematic of RFID with Motor

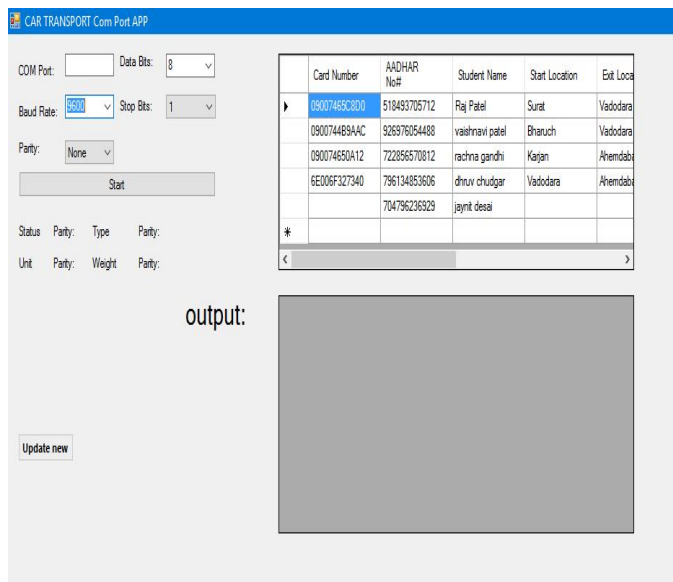


Figure 4. VB.NET Page with Detail

#### IV. CONCLUSION AND FUTURE WORK

By doing Advancement of toll plaza, the best solution over money loss at toll plaza by reducing the men power required for collection of money also reduce the traffic. Here technique will include the RFID tag & reader, which in coordination with each other can used to detect the vehicle identity. If the RFID tag is not identify, then image of car is capture by camera. A new user needs to register himself after which his identity is verify with RFID tag. The new record is then store by the microcontroller to grant future access.

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