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'Automatic Toll Collection System Using RFID'

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Abstract- RFID based "Auto Challan" framework gives paperless entry of toll doors with completely 'Auto Challan'. They help in diminishing toll entryways activity and stay away from unlawful section of vehicles through a toll door. Computerized toll accumulation framework for toll entryway in view of RFID innovation. The electronic toll collection system (ETC) is a remote interchanges framework to execute ways. In the frameworks, reflected, occupied, shadowed waves by the covering, divider, or, both, and impedance waves from neighboring paths may bring about the issues in framework operations. To stifle the undesired waves said above, radio safeguards are introduced in general surfaces of toll entryways. Be that as it may, the capacity of radio safeguards might be corrupted by maturing decay, and the capacity of radio safeguards ought to be kept up for the manageable utilization of the ETC. At that point , the framework which can assess the execution of radio safeguards in required. In this foundation, the proposition proposes the radio spread ways estimation framework, which can distinguish the radio engendering ways in the ongoing estimation by utilizing the ETC signal. Undesired radio engendering empowers us to locate the radio safeguards corrupted. Likewise the proposal additionally talks about the new plan to recognize the proliferation ways.

Keywords*: RFID, Reader, Prepaid Card, Stepper Motor, Database, GSM module.*

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I. INTRODUCTION

Electronic Toll Collection (ETC) is an innovation that takes into consideration electronic installment of tolls ETC is quick turning into an all inclusive acknowledged technique for toll accumulation, a pattern significantly supported by the development of interoperable ETC advancements.

Electronic Toll Collection (ETC) is utilized as a part of cordoned urban territories, over extensions, in passages, in High Occupancy Toll (HOT) paths, on toll streets, or through freeways. Toll charges are by and large in view of mileage, upkeep necessities, or clog levels.

Until late years most ETC frameworks depended on utilizing radio gadgets as a part of vehicles that would utilize restrictive conventions to distinguish a vehicle as it disregarded under a gantry the roadway. All the more as of late there has been a move to institutionalize ETC conventions around the Dedicated Short Range Communications convention that has been advanced for vehicle wellbeing by the Intelligent Transportation Society of America, ERTICO and ITS Japan.

A toll accumulation framework can be either open or shut (cordoned). Most present cordoned region estimating plans use ETC. This shut framework requires all passages and ways out to have either manual tollbooths or an ETC framework. About all manual toll frameworks have changed over to an ETC framework.

For instance, the cordoned toll zone in Singapore, which was initially executed in 1975, has substituted its manual toll accumulation framework with ETC focuses.

In an open toll framework, for example, a toll street, toll stations are situated along the office. Around 70% of the toll streets in the United States now utilize ETC.

II. PROBLEM STATEMENT

Indian National highways these days get to be one of the busiest roadways in India. The central point incorporate the expanding number of vehicles along government courses and the expanding populace in significant urban areas and towns of India. This is the motivation behind why it generally stuck and congested when the client need to make installment at toll corner particularly amid top time and crest season, for example, Holiday. Ordinarily, the majority of the clients utilizing money installment however the exchange will take longer time. For touch n go, it is more advantageous than money since client no more need to plan for little change or hold up in line at the money path to finish the exchange. However, this strategy likewise needs a procedure to touch the screen and expend time too, yet it takes less time contrasted

with money installment. Savvy Tag can be depicted as the speediest approach to make installment which permit client to pay toll with drive through accommodation yet the gadget for this technique is costly. Both Touch n Go and SmartTag perhaps have plausibility in security issue. For instance, if the card had scratched or lost, possibly the client can not utilize that application and need to report for the substitution. Thus, keeping in mind the end goal to stop every one of these issues and impediment, this anticipate is presented as a mechanized or a more advantageous method for gathering the toll and movement administration. It is called as an Auto Challan.

The following are the objectives of the proposed work:

Reduce longer waiting time in a Toll queue.
Provide traveler ease of Toll payment.
Reduce illegal Toll gate entry.
The major advantage to ETC is that users are able to drive through the toll plaza at highway speeds without having to slow down to pay the toll.

The scope of the proposed work is as follows:

Entire process takes a matter of seconds to complete.
Electronic system records transaction, including the time, date, plaza and Toll charge of each vehicle.
Allow drivers to pass through the system at 55 miles per hour (86 kmph).
The system may use any existing local GSM/CDMA network for collection of Toll payment.
The same idea can also be used to improve car parking, traffic control and security systems.

III. LITERATURE SURVEY

1.Automated toll collection system using RFID.
ATCS is an Automated Toll Collection framework utilized for Gathering assess consequently. In this we do the ID with the assistance of radio recurrence. [1]

2. RFID Based Automated Toll Plaza system.
This examination paper depicts the mechanized toll accumulations framework for toll doors in light of RFID innovation. [2]

IV. METHODOLOGY

At whatever point any individual purchases a vehicle, one first needs to get his or her vehicle enrolled at the RTO office. RTO authorities won't just dole out a number plate to it additionally will give a RFID empowered shrewd card or a tag. This card will have a one of a kind ID achievable to use with that vehicle as it were. They will likewise make a record for the utilization of that specific brilliant card and keep up exchange history in database. Client needs to store some base add up to this record. Each time an enrolled vehicle approaches the toll stall, first the Infrared sensors will identify the nearness of the vehicle. It will thusly actuate the RFID circuit to peruse the RFID empower shrewd card altered on the windscreen of the vehicle. Exchange will start, contingent on the parity accessible toll will be deducted straightforwardly or the vehicle will be guided towards another path to pay charge physically. The product further overhauls the subtle elements in the Centralized database server. It additionally triggers component to create the bill and will be sent to client as an instant message. Then again, at whatever point any vehicle proprietor enlists a protestation to RTO office in regards to burglary separate section is made in the database.

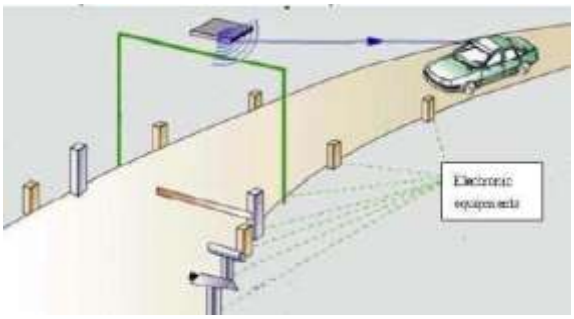
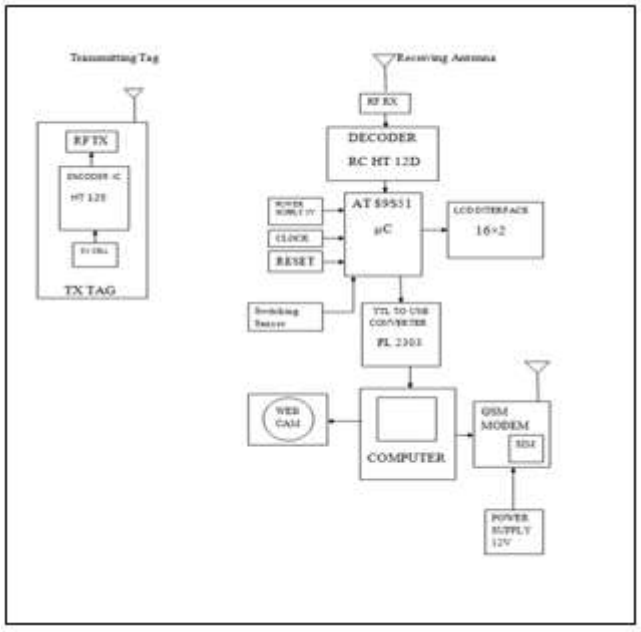


Fig. Working module

Now any vehicle arriving at toll booth with same ID as already present in stolen vehicle category will be easily identified as the ID assigned with it is unique.
All the toll plazas will be connected to each other along with the centralized server in the form of LAN. Updates of any sort of transaction will be immediately updated to local database and centralized server.

V. IMPLEMENTATION

The circuit is divided into two parts
1. Transmitter 2. Receiver



For transmitter section, the different commands signals are transmitted via RF transmitter module of 433 MHz. it has 4 pins of antenna, Vcc, Gnd, & serial data input. Antenna,+5v & Gnd are connected to respective places and serial data input is generated from encoder IC HT12E. This encoder IC's function is to convert parallel data into serial data address lines of encoder are grounded because they are not used. Data lines are

fed with command signals since four lines are available 16 different commands can be generated. The output modulating frequency is decided by resistor connected at OSC pin of the encoder. Currently because of 1.2Mohms resistor, it is 30 KHz. The output of encoder is fed to RF transmitter module is currently Roughly 100 sq. Ft. On receiver side the data is received by RF receiver module of 433 MHz. This demodulated signal is fed to decoder for further decoding. If address send from encoder IC GND matches with decoder address then valid tone (VT) signal on decoder goes high, which indicates receives signal. The decoded by decoder is fed to uC for further control of relay. Uc requiers mainly three things for operation. Which are power supply clock & reset. Power supply provided to uC is +5v & GND on pin40 &pin20 respectively. On osc pin18 &19,a crystal oscillator is connected which generates clock for program execution for reset on pin9 & 10k resistor &10k capacitor is connect which reset controller on power up.

VI. CIRCUIT DIAGRAM

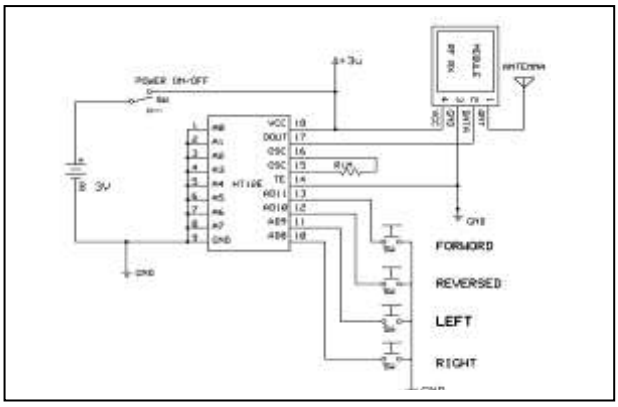


Fig. Circuit Diagram for Transmitter

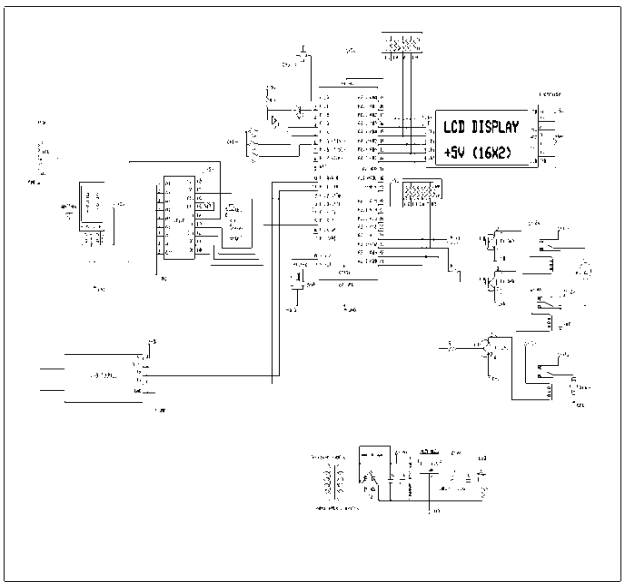


Fig Circuit Diagram for Receiver

VII. HARDWARE AND SOFTWARE

The main system components are as follows:
1) RFID tagged vehicle
2) Microcontroller AT89S51.
3) RF module (434Mhz)
4) Power supply unit.
5) LCD Display.
6) GSM module (SIM 900)
7) Camera
8) Stepper motor
9) Relay (SPDT)

The main system components of software are as follows
1) Embedded C language
2) Visual basics 6.0

VIII. ALGORITHM

The RFID peruser peruses the ID number from the RFID tag and after that will check with the recorded database in host PC framework.

On the off chance that the clients are not enroll, they have to make register and the approved individual at the toll door get client data from them.

The client can overhaul the equalization at the client upgrading structure. In addition, if the client quit from utilizing this framework, the recorded data can be erased on the database.

On the off chance that the client crosses the Toll square then the toll will get deducted naturally from his/her enrolled account.

If there should be an occurrence of invalid tag the peruser will send the data to host PC. Furthermore, activity controller can take toll in hard money.

Stop.

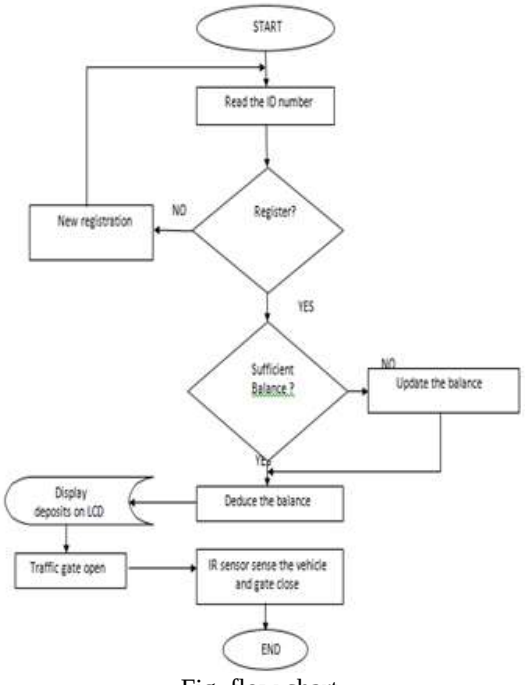


Fig. flow chart

IX. ADVANTAGES AND DISADVANTAGES

Advantages

Whole process takes a matter of seconds to finish. Electronic framework records exchange, including the time, date, square and toll charge of every vehicle. Permit drivers to go through the framework at 55 miles for every hour (86 kmph). The other favorable position found in a few nations is that the framework can be utilized as a part of stopping zones also. The primary point of interest is about the velocity pick up. Since the charging is programmed, the street is less inclined to blockage.

Disadvantages

This framework requires less labor so business of movement control individuals may get diminished. In the event that the tag is harmed then framework will neglect to identify the approved vehicle proprietor.

X. CONCLUSION

It permits an electronic money related exchange to happen between a vehicle and toll office. This diminishes the difficult work and defers that regularly happen on streets. This arrangement of gathering tolls is eco-accommodating furthermore brings about expanded toll path limit. In addition, the suburbanites need to sit tight less to pay the tolls, which is helpful for them. Electronic toll accumulation framework is proficiently utilized as a part of the activity reconnaissance for identification which helps in distinguishing occurrences. India's Metro Road System takes a shot at electronic toll accumulation framework. Alongside world pioneer KapschTrafficCOM, the legislature has set up numerous programmed and self-loader toll accumulation frameworks. This new framework incorporates different installment choices and aides in activity and stopping administration.

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