



# “AUTOMATED TOLL COLLECTION SYSTEM USING RFID”

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**Abstract** - With the emerging technologies, there is an innovation in various sectors. However, if we consider about the Toll collection Booths, there is still an Old and Ineffective Process used. To overcome the long process and queues, an effective way can be implemented using IoT. A smart card-based toll booth system is designed, which can identify the vehicle arriving at toll plaza. In addition to this it also records its registered RFID number and verify the same data with the information stored in the cloud. To implement this proposed system, every vehicle owner should possess an RFID (Radio Frequency Identification) based card. The Toll Management System monitors the authorized vehicle, it opens the toll gate with a fix toll amount to be transected from its account. The Internet servers will maintain all the data of the user with their transactions and balance. To make it possible, here the combination of microcontroller and RFID using IoT is been automated. Activities like Trespassing on borders and the Surveillance system

can be extended using this type of Toll payments system. The proposed system

thus automates the one step ahead to the Digital India Scheme for the citizens residing in this country.

## 1. INTRODUCTION

The quantum of business in recent times is adding due to the adding number of vehicles. Every day, millions of people use their particular vehicles rather of public transport systems and due to this, there is increase in business in developing countries. adding number of vehicles on the roads, affect into numerous problems similar as traffic, air pollution and energy destruction etc. There are certain types of roads where you have to pay plutocrat to travel on the road which are called Risk Roads. To travel on that road, you need to pay a duty called a risk duty. Risk duty is applied only to the druggies of the risk road. occasionally there may also be further than one Risk Plaza on one particular risk road. A risk road does not stay a risk road ever. Sacrifices may be

removed, once the cost of construction has been recovered from the risk quantum is collected. All trace risk forecourts are manually operated, where an driver collects cash from the motorist and provides a damage. This procedure can be slow, which frequently results in business logjams at the risk forecourts on busy roadways. Although, there are numerous lanes on risk cells to keep business moving as snappily as possible. On some lanes, you can pay with change or cash, while there are also other lanes called express lanes which are for the druggies who have an electronic pass attached to their vehicle. Special sensors senses vehicle's electronic pass and deducts quantum directly from an account, similar as a credit card or a bank account, whichever is connected to your electronic pass. Generally, these electronic passes are used by the commuters to travel the risk roads daily in order to avoid detention at risk roads to pay cash.

### 1.1. Motivation

In the ultramodern times, vehicles have a lot of issues on passing the risk cell because of business in it and long ranges which consumes a lot of coffers and energy of the vehicle. The design helps in reducing all of that by doing automatic risk cell gate opening and saving coffers.

## 2. LITERATURE SURVEY

1. Electronic Risk Collection System using RFID Author AjitS. Mali<sup>1</sup>, Komal Barge<sup>2</sup>, Sneha Kulkarni<sup>2</sup>, Vrushali Mandhare<sup>2</sup>, Akshaya Patil<sup>2</sup> Abstract This paper substantially concentrated on how the electronic risk collection system reduces homemade work cargo using RFID technology. Eventually, this system reduces terrain pollution due to the burning of energy as well as reduces the waiting time of druggies in risk line. System substantially uses the centralized database due to which this system has stoner friendly approach. druggies can

pierce the website and may perform their risk sale from any position. Their sale will reflect in the centralized database. Due to the use of online sale, druggies do n't need to carry cash with them. This leads in the reduction of mortal error being at the risk cells. Cashless deals gives the translucency to this system. Practical perpetration of this system is explained in details in this paper. KEYWORDS Radio frequence Identification( RFID), RFID anthology, Risk forecourts, Digital India. 2. Automated Risk Collection System Using RFID Author Pranoti Salunke<sup>1</sup>, Poonam Malle<sup>2</sup>, Kirti Datar<sup>3</sup>, Jayshree Dukale<sup>4</sup> Abstract ATCS is an Automated Risk Collection System used for collecting duty automatically. In this we do the identification with the help of radio frequence. A vehicle will hold an RFID label. This label is nothing but unique identification number assigned. This will be assigned by RTO or business governing authority. In agreement with this number we will store, all introductory information as well as the quantum he has paid in Page 1 of 3 advance for the Risk collection. anthology will be strategically placed at risk collection center. Whenever the vehicle passes the risk naka, the duty quantum will be subtracted from his repaid balance. New balance will be streamlined. Incase if one has inadequate balance, his streamlined balance will be negative bone . To attack this problem, we're startling a sound, which will warn the authority that this vehicle does n't have sufficient balance and that particular vehicle can be trapped. As vehicles do n't have to stop in a line, it assures time saving, energy conservation and also contributing in saving of plutocrat. Keywords – ATCS, RFID Reader, RFID Tag, Toll Collection, reimbursed account.

### 3. SYSTEM ANALYSIS

#### 3.1 SYSTEM ARCHITECTURE

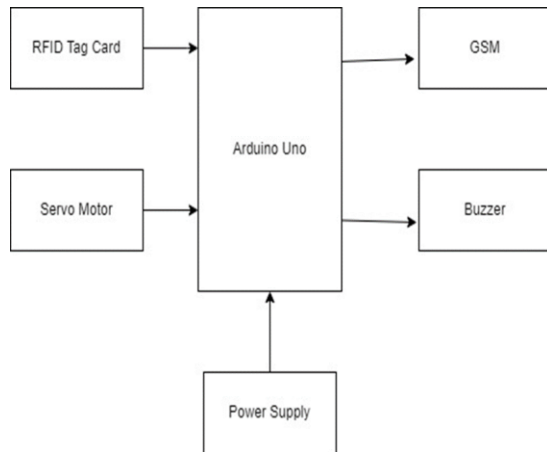


Fig. System Architecture

In this system, we've introduced an automatic risk collection process by using RFID technology and IoT. It's the simplest way of risk collecting process involving time-consuming and lower force as compare with the being system. A unresistant label is used in this process, an RFID label that doesn't contain any battery. The RFID label has a useful life of twenty further at least. This size of it's small which makes it easy to carry. With the help of IoT data gets automatically stored on the web. It's veritably accurate and eliminates the debit of the being system.

#### 3.2 Component Information

##### Arduino MEGA

##### Description:-

Arduino Mega is an open-source microcontroller board grounded on the ATmega328P. It was designed and manufactured by the Arduino LLC in Italy. It has 14 digital input/ affair legs, 6 analog inputs, a 16 MHz quartz demitasse, a USB connection, and a power jack. The board is equipped with a number of detectors similar as a temperature detector, light detector, and moisture detector, among others, which can be added as per the conditions of a design. With its simple and

accessible stoner interface, Arduino MEGA is extensively used for colorful DIY electronics systems, robotics, and Internet of effects operations. Arduino Uno is a microcontroller board grounded on the ATmega328P( datasheet). It has 14 digital input/ affair legs( of which 6 can be used as PWM labors), 6 analog inputs, a 16 MHz quartz demitasse, a USB connection, a power jack, an ICSP title and a reset button



##### Specifications:-

Microcontroller: ATmega328P

Operating Voltage: 5V

Input Voltage (recommended): 7-12V

Input Voltage (limit): 6-20V

Digital I/O Pins: 14 (of which 6 provide PWM output)

Analog Input Pins: 6

DC Current per I/O Pin: 40 mA

DC Current for 3.3V Pin: 50 mA

Flash Memory: 32 KB (of which 0.5 KB used by bootloader)

SRAM: 2 KB

EEPROM: 1 KB

Clock Speed: 16 MHz

Length: 68.6 mm



Width: 53.4 mm

Weight: 25 g

Connectivity: USB, power jack, ICSP header

### SIM 800L GSM/GPRS Sensor with module

The SIM800L is a compact, quadrangle- band GSM/ GPRS module designed for global request. It's designed for use in operations that need to communicate with a GSM network, similar as transferring SMS dispatches, making voice calls, and connecting to the Internet using GPRS. The module is compatible with AT command set, which makes it easy to use and integrate into an being system.

#### Specification

Operating Voltage 3.4 V to 4.5 V

**Frequency bands** The SIM800L supports the following frequency bands GSM 850 MHz, EGSM 900 MHz, DCS 1800 MHz, and PCS 1900MHz.

Output periodical data Temperature Range-40 °C to 80 °C



### RFID Card

An RFID( Radio- frequency Identification) card is a type of electronic device used for storing and transmitting data wirelessly. RFID cards are used in a wide range of operations, including access control, payment systems, and asset shadowing. An RFID card generally consists of an intertwined circuit( IC) and an antenna. The IC stores the card's unique identification number, which can be read by an RFID anthology when the card is brought in close propinquity of the anthology. The anthology sends a radio frequency signal to the card, which responds by transmitting its stored data back to the anthology



### Servo motor

#### Description:

A servomotor is a unrestricted- circle servomechanism that uses position feedback to control its stir and final position. The input to its control is a signal( either analog or digital) representing the position commanded for Page 2 of 3 the affair shaft. The motor is paired with some type of position encoder to give position and speed feedback. In the simplest case, only the position is measured. The measured position of the affair is compared to the command position, the external input to thecontroller.However, an error signal is generated which also causes the motor to rotate in either direction, as demanded to bring the affair shaft to the applicable position, If the affair position differs from that needed. As the positions approach, the error signal reduces to zero, and the motor stops. The veritably simplest servomotors use position- only seeing via a potentiometer and bang- bang control of their motor; the motor always rotates at full speed( or is stopped). This type of servomotor isn't extensively used in artificial stir control, but it forms the base of the simple and cheap servos used for radiocontrolled models. More sophisticated servomotors make use of an Absolute Encoder( a type of rotary encoder) to calculate the shafts position and infer the speed of the affair shaft. A variable- speed drive is used to control the motor speed. Both of these advancements, generally in combination with a PID control algorithm, allow the

servomotor to be brought to its commanded position more snappily and more precisely, with lower overshooting.



## Buzzer

### Description:-

The Passive Buzzer Module KY-006 is a type of piezoelectric alarm detector generally used in DIY electronics and robotics systems. It's a compact, tone-contained module that generates an audible tone when a voltage is applied to its input. The KY-006 has a piezoelectric ceramic slice inside which vibrates when a voltage is applied, generating a sound. It's unresistant, meaning that it doesn't have its own internal oscillator and must be driven by an external signal



## 4. RESULT

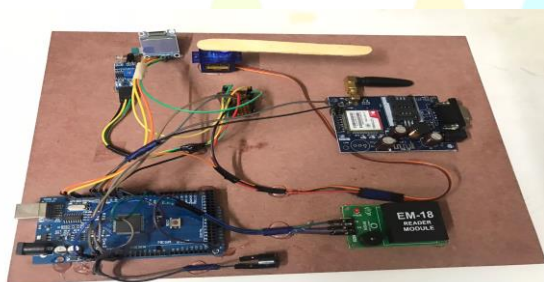


Fig .Hardware

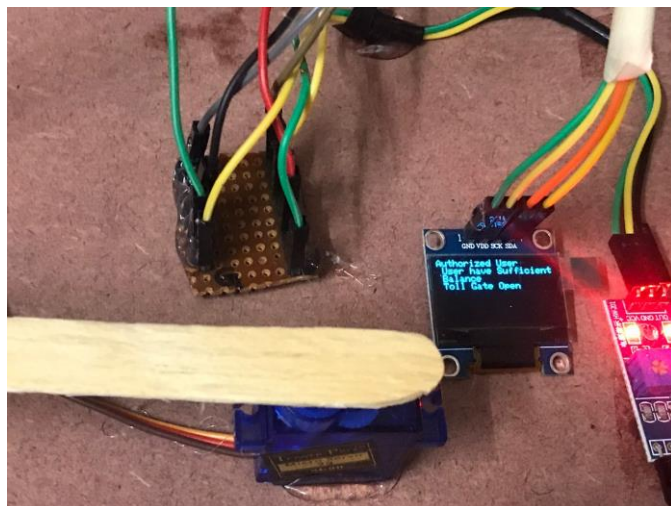


Fig. Output

## 5. CONCLUSIONS

The Electronic Toll Collection system in thruway grounded on RFID, a design scheme was put forward. It's low cost, high security, far communication and effectiveness, etc. It not only improves the passage capability of thruway but also improves the technology position of charge. Electronic risk collection system using RFID is an effective measure to reduce operation costs and freights, at the same time, greatly reduce noise and contaminant emigration of risk station. In the design of the proposed. Electronic risk collection( ETC) system, real time risk collection and anti-theft result system have been designed. This reduces the homemade labour and detainments that frequently do on roads. This system of collecting sacrifices is eco friendly and also results in increased risk lane capacity. Also anti-theft result system module which prevents end of any defaulter vehicle is enforced, therefore assuring security on the highways.

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