INTERNATIONAL JOURNAL
FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

RFID based Smart Toll Collection and Speed Measurement System

S. Venuprasad[1], Polikal Chandana[2], Bodla Vikram[3], Chirra Pavan[4]

[1]Associate Professor, Mallareddy institute of tech and sci, Telangana, India

[2, 3, 4]Electronics &communication engineering, Mallareddy institute of tech and sci, Telangana, India

Abstract: The computerized cost assortment framework utilizing detached Radio Frequency Identification (RFID) tag rises as a persuading answer for the manual cost assortment strategy utilized at tollgates. Time and productivity involve need of present day. So as to defeat the significant issues of vehicle clog and time utilization RFID innovation is utilized. RFID peruser fixed at tollgate outline peruses the label joined to windshield of vehicle. The article location sensor in the peruser distinguishes the methodology of the approaching vehicle's tag and cost finding happens through a prepaid card appointed to the concerned RFID label that has a place with the proprietors' record.At the same time it measures the speed of the vehicle and alerts toll gate employee if over speeds.This makes tollgate exchange progressively helpful for the open use.
Keywords: RFID Reader, IR sensors ,L293 Driver

I. INTRODUCTION

The principle thought behind executing RFID BASED TOLL COLLECTION SYSTEM is to mechanize the cost assortment process their by diminishing the long lines at fee collection counters utilizing the RFID labels introduced on the vehicle. Furthermore, it can help in vehicle robbery location as well as can follow vehicles traverse speeding vehicles. This framework is utilized by vehicle proprietors, framework director. Other general points of interest for the drivers incorporate fuel reserve funds and diminished versatile discharges by decreasing or disposing of deceleration, holding up time and speeding up. In the mean time, for the cost specialists additionally get the advantages referenced below[2]:

The advantages for the drivers include:

A. Less or shorter lines at cost courts by expanding fee collection counter help turnaround rates.
B. Quicker and progressively effective assistance (no trading cost expenses by hand)
C. The capacity to make installments by keeping an equalization on the card itself
D. The utilization of postpaid cost articulations (no compelling reason to demand for receipts)
E. Brought down cost assortment costs
F. Better review control by brought together client record and
G. Extended limit without building more frameworks .

II. EXISTING SYSTEM

Dynamic wave Inc [3] has as of now conveyed an arrangement of dynamic label vehicle checking arrangement. Dynamic wave vehicle items have a scope of 30 meters and work in the 916 – 927 MHz for the transmit activities and 433 MHz for the get connect. Dynamic wave items are presently furnished with 256 Kbits of fixed memory. The tag is controlled with a replaceable 3V battery and the all out weight is 14 grams. Rudimentary signs are appeared with the assistance of squinting LEDs and blaring sounds. Savvy key Access Control Systems [4] have a customer – server model based framework with a SQL server dealing with different vehicle checking frameworks.

They have planned a UI utilizing the Microsoft .NET Framework. Keen key likewise work in the 900MHz band however have a little scope of 30 meters. RFID based cost assortment framework [1] utilizes dynamic RFID label which utilizes vehicle battery power.

The execution is isolated into the plan of two modules-the Vehicle Module (Active Tag) and the Base Module. The two modules impart by means of RF modem associated with every module. These RF modules convey over the ISM Frequency Range of 902 – 928 MHz.

III. PROPOSED SYSTEM

This undertaking manages the rearrangements of strategy followed by travelers to pay cost at cost assortment corners, such as making it robotized, vehicle robbery identification and so forth. Every one of these exercises are done utilizing single brilliant card (RFID tag), in this manner sparing the endeavors of conveying cash and records physically [5]. Programmed Toll Collection: The RFID Readers mounted at fee collection counter will peruse the paid ahead of time RFID labels fixed on vehicles' windshield and naturally particular sum will be deducted. In the event that the tag is expelled from the windshield, at that point cameras fixed at two locales at cost square take snaps of the front and back number plate. Since each vehicle enlistment ID is connected to clients account, cost can be deducted from the record bank legitimately. Vehicle Theft Detection: When vehicle is taken the proprietor registers protest on the site with its enrollment ID and interesting RFID label number. Presently when taken vehicle passes by the cost court, the label fixed on it is coordinated with the taken vehicle's tag in the database at the fee collection counter. Signal Breaking Avoidance: The vehicle overlooking the traffic sign will be identified by the RFID perusers fixed at signal intersection and will be informed to the traffic police. This should be possible proficiently and incredible precision.It also calculates the speed of the vehicle and alerts the toll employee , that was the modification done to the existing system . Following Over speeding Vehicle: Vehicle going above speed point of confinement can be followed 100 % exactness.

IV. PROCEDURE

At whatever point any individual purchases a vehicle, one first needs to get their vehicle enlisted at the RTO office. RTO authorities won't just allocate a number plate to it yet in addition.Vikky will give a RFID empowered brilliant card or a tag. This card will have a special ID doable to use with that vehicle as it were. They will likewise make a record for the utilization of that specific savvy card and keep up exchange history in database. Client needs to store some base add up to this record. Each time an enrolled vehicle moves toward the fee collection counter, first the Infrared sensors will distinguish the nearness of the vehicle and speed of the vehicle . It will thusly initiate the RFID circuit to peruse the RFID empower brilliant card fixed on the windscreen of the vehicle. Exchange will start, contingent on the parity accessible cost will be deducted straightforwardly or the vehicle will be guided towards another path to pay charge physically. The product further updates the subtleties in the Centralized database server. It additionally triggers component to produce the bill and will be sent to client as a book .

V. BLOCK DIAGRAM
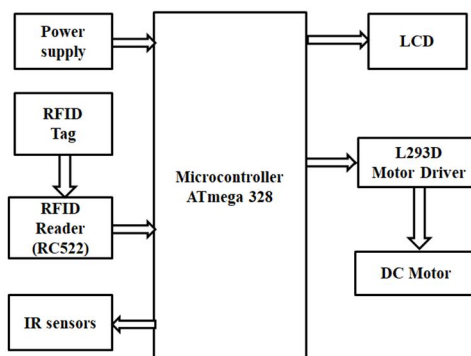
A. RFID reader (RC522)

Fig:1 RFID READER

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require lineof-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.
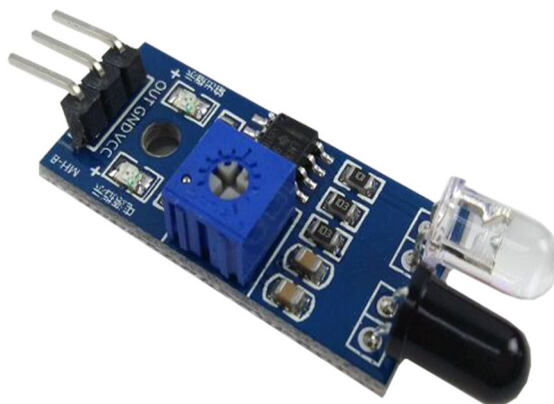
B.   IR Sensor

Fig:2 IR SENSOR

Sensors are basically electronic devices which are used to sense the changes that occur in their surroundings. The change may be in color, temperature, moisture, sound, heat etc. They sense the change and work accordingly. In IR sensor the there is emitter and detector. Emitter emits the IR rays and detector detects it.

C.   L293 Motor Driver

Fig: 3 L293d motor driver

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two **DC MOTOR** with a single L293D IC
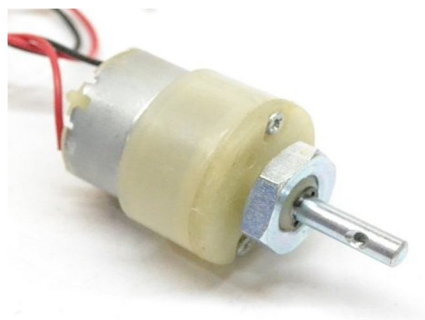
D. DC Motor

Fig: 4 DC MOTOR

A DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor.
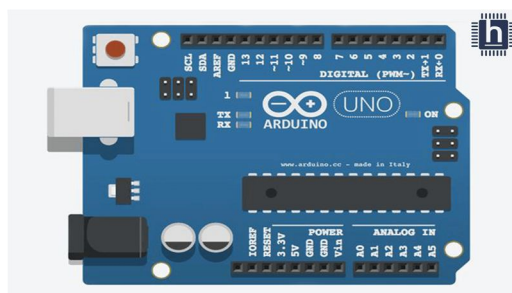
E. Arduino UNO

Fig:5 ARDUINO

Arduino is a microcontroller board dependent on the ATmega328P. It has 14 advanced I/O pins , 6 simple information sources, a 16 MHz quartz precious stone, a USB association, a power jack, an ICSP header and a reset button. It contains everything expected to aid the microcontroller. Arduino Software (IDE) were the transfer adaptations of Arduino, presently developed to more current discharges. The UNO board is the first in a progression of USB Arduino sheets, and the transfer model for the Arduino stage; in order to find broad rundown of current, past or obsolete sheets see the Arduino file of sheets.

F. LCD Display

Command Code LCD008 16 x 2 Alpha numeric Display FRM010 Serial LCD Software (optional) Contents 1 x 16x2 Alpha numeric Display 1 x data booklet Initiation Alpha numeric presentations are utilized in a broad range of applications, including palmtop PCs, scanners, retail location terminals, clinical instruments, mobile phones etc. The 16 x 2 wise alphanumeric spot network displays is able to display 224 distinct characters and images. A list of characters and images are printed on pages 7/8 (note these images can fluctuate between brand of LCD utilized). This booklet provides all the specialized details for connecting the unit, which requires a single power supply (+5V)
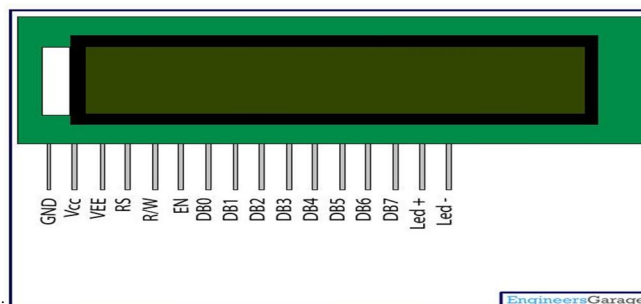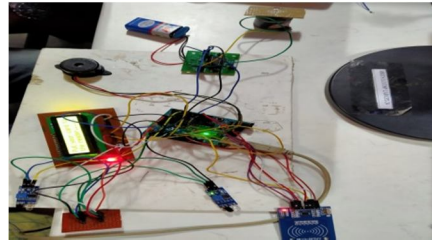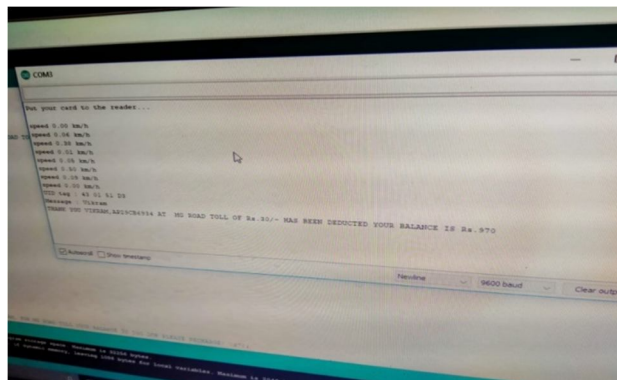

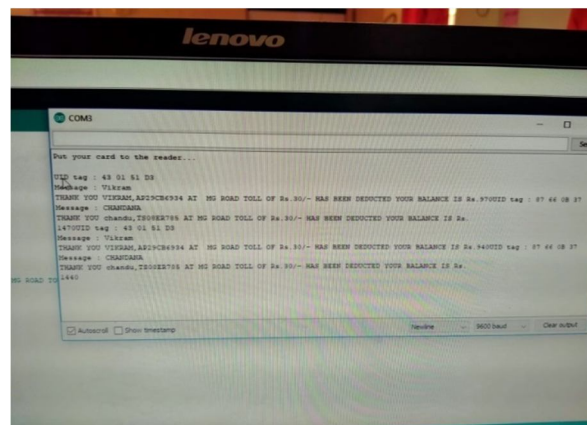Fig: 6 LCD

VI. RESULTS

1. HARDWARE KIT

2. LCD

3. Serial monitor speed

4. Final serial monitor

VII.   CONCLUSIONS

The electronic cost assortment framework in interstate dependent on RFID, a plan plot was advanced. It has qualities of minimal effort, high security, far correspondence separation and high productivity, and so on. It not exclusively can improve innovation level of charge, yet in addition improve entry capacity of interstate. Electronic cost assortment framework is a powerful measure to lessen the executives expenses and charges, simultaneously, significantly decrease clamor and poison discharge of cost station. In the plan of the proposed Electronic cost assortment (ETC) framework, ongoing cost assortment and hostile to robbery arrangement framework have been planned. This lessens the physical work and defers that frequently happen on streets. This arrangement of gathering tolls is eco-accommodating and furthermore brings about expanded cost path limit. Likewise an enemy of burglary arrangement framework module which forestalls going of any defaulter vehicle is executed, in this manner guaranteeing security on the roadways.It also helps in detecting speed of the vehicle at toll gates.

REFERENCES

[1] RFID based toll collection system,2011 IEEE third international Conference

[2] D. M. Grimes and T. O. Jones, ―Automotive radar: A brief review,‖ Proc. IEEE, vol. 62, no. 6, pp. 804–822, Jun. 1974.

[3] ActiveWaveInc. http://www.activewaveinc.com

[4] Smart key Access Control System http://www.smartkey-rfid.com

[5] D. M. Grimes and T. O. Jones, ―Automotive radar: A brief review,‖ Proc. IEEE, vol. 62, no. 6, pp. 804–822, Jun. 1974.

[6] Liu Bin, Lu Xiaobo and GaoChaohui. ―Comparing and testing of ETC modes in Chinese freeway.‖ Journal of Transportation Engineering and Information, 5(2), 2007, pp.31-35

BIOGRAPHIES

Description about the author1
S.VENU PRASAD
M.E
ASSOCIATE PROFESSOR
MRITS

Description about the author2
P CHANDANA
ECE
MRITS

Description about the author3
B.VIKRAM
ECE
MRITS

Description about the author4
CH PAVAN
ECE
MRITS

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 ⓒ (24*7 Support on Whatsapp)