

Tollgate Automation System Using RFID

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Abstract: In toll collection system the RFID technology is main concern. The RFID reader placed in a toll booth counter and RFID tag is placed in a each vehicle. When the signal comes from the RFID tag is received by the RFID reader. The RFID reader collects the data base from micro controller system. The RFID reader sends the signal to LCD display and personal computer. When the amount is not transfer from the vehicle owners' account to toll collection, immediately the toll person sends message to GSM system the vehicle is stopped. After the manual payment the vehicle is started.

Keywords: RFID Technology, GSM, Zig-bee

I. INTRODUCTION

Now a day's traffic is a major problem, near the toll booth stations, the main reason for this problem is manual payment collection process to avoid traffic congestion we are implement automatic tollgate collection system using RFID technology and GSM technology. This paper refers to reduce the traffic, man power and time consumption.

To stop all traffic and inconvenience problems we introduce an automated or a more convenient [1].way of collecting the toll amount using RFID and GSM technology. We have a two module, one module is toll booth it act as a receiver section. Another module is vehicle it act as a transmitter section. This makes tollgate transaction more convenient for the public.

To stop all traffic and inconvenience problems we introducing automated or a more convenient.

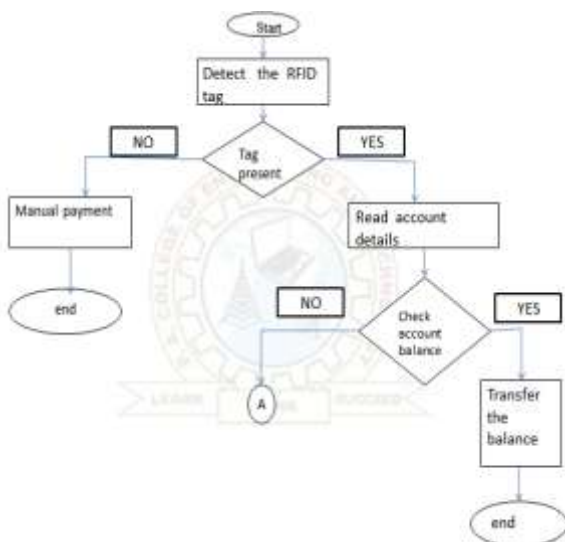
A. TRANSMITTER SIDE

In the transmitter side the RFID reader receive the signal from the active tag and load the information in system from the database [1]. The amount is taken from the account. If tag is not present manual payment is done. If user doesn't have sustained balance the alarm message is given to the user.

B. RECEIVER SIDE

In the receiver side the message is received by the user. If the user responded for the message the manual payment is collected not the vehicle is stopped immediately by stopping the ignition through GSM [5].

II. FLOW CHART



III. SYSTEM HARDWARE DESIGN

The hardware has two parts one is transmitter part and other is receiver part. Transmitter part is placed in the toll booth and receiver is placed in the vehicle.

The hardware have the many components ATMEGA16 microcontroller, RFID Module, MAX232, GSM module, LCD Display, Ignition controller etc. RFID reader reads the signal

The flow chart represents the overall concept of project in automation of toll collection systems in step by step process. This way of approach is only for understanding purpose in easy way. System using RFID technology and GSM technology. This paper refers to reduce the traffic, man power and time consumption.

from the active tag fixed in the vehicle [3]. It load the data of particular tag form the database like type of the vehicle, owner name, amount balance etc.

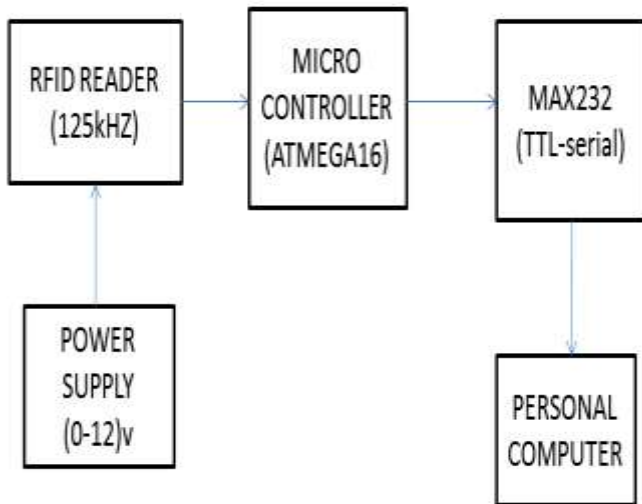


Figure1: Tollgate section

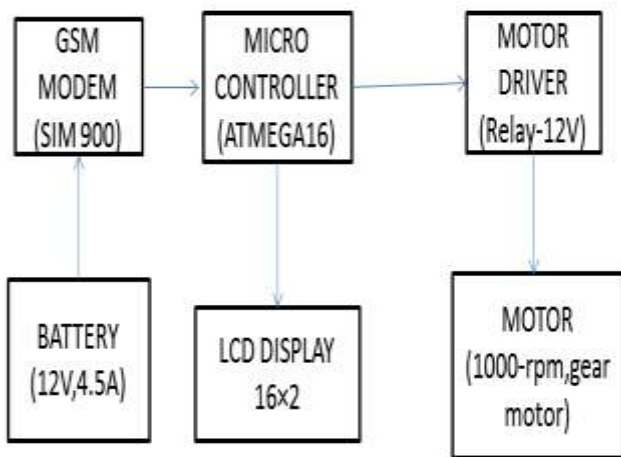


Figure2: Vehicle section

A. Microcontroller

ATMEGA 16 Microcontroller is used in this system. It is 16 bit microcontroller. The output voltage is 4.5-5v. The operating frequency is 16MHz. It provides the fast and good performance [4].

B. GSM Module

GSM Means Global System Mobile. It is the wireless modem works in wireless networks. Here we are using SIM900. It working based on the command signals. It is used

to stop the vehicle when the command is received from the toll person. It is the fastest system to send and receive the signals.

C. RFID Module

RFID Reader:



RFID means Radio Frequency Identification. It works in 125 KHz frequency. It retrieves the data stored in the RFID tags. It mainly used for its' low power consumption and greatest range of 100m.

RFID tag:

The RFID tag is also known as transponder. It consists of antenna and the chip stores the unique serial number. Mostly Micro strip antenna is used.

D. LCD Module

Here we are using 16x2 Numeric LCD. It has 8 pin data lines and 4 control lines. It gives the current status of microcontroller. It consists of 16 character in each two rows. It interfaced with microcontroller in 4 pin mode.

IV. SOFTWARE MODULE

The Atmel studio 6.2 software is used for coding .The embedded C language is used to write the codes. It is the general purpose coding provides code efficiency.

A. Circuit Diagram

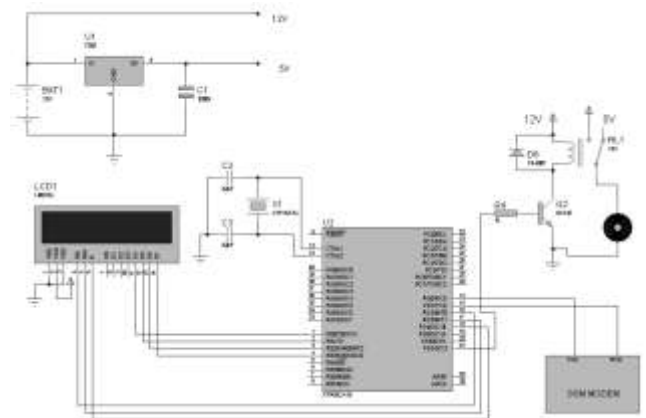


Figure3: System Circuit Diagram

B. Tollbooth Section

In tollbooth when the vehicle reached the RFID reader reads the card fixed in vehicle. The information is loaded in display from the database. The amount is automatically paid from the account. The sufficient amount is not present in the amount, the stop message is send by the employee the GSM.[2]

C. Vehicle Section

In the vehicle section after receiving the “STOP” message the GSM sends the signal to microcontroller. It stops the motor usingthe relay. After the manual payment the car is started using the “START” message from the employee.

V. CONCLUSION

The tollgate automation system is used to reduce traffic congestion in cities. The automation system which helps to pay tax amount from the users account without stopping the vehicle. By this the traffic congestion is avoided. It provides the security and man power is reduced. Present day time is major concern by this automation system time is reduced.

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