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AUTOMATIC TOLL TAX COLLECTION SYSTEM USING RFID

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ABSTRACT:

RFID Toll Road Payment systems have made a significant contribution to alleviating traffic congestion in today's major centres. It is one of the simplest ways to organise a huge flow of traffic. When a vehicle passes through a toll gate on any route, the RFID reader indicates that it has crossed the cleared. This technology eliminates the need for human toll-based systems, and the tolling system operates via RFID. Because the tag can be read from a distance, the system implemented is highly efficient, saving travellers time and money.

INTRODUCTION:

Today, we can observe that current toll systems survive for many years. We also see that politicians and certain persons with high connections or in higher positions in numerous government occupations are able to travel without paying a toll. Travelers have to wait in a huge line to pay the tax, and the procedure takes a long time due to human assessment. Radio-frequency identification (RFID) is an automated identifying technology that stores and retrieves data via RFID tags or transponders. The technique demands some collaboration between an RFID reader and an RFID tag. An RFID tag is a device that may be attached to or inserted into a product, animal, or person to enable identification and tracking via radio waves. Some tags can be read from many meters away, even outside the reader's line of sight.

DESIGN AND COMPONENTS:

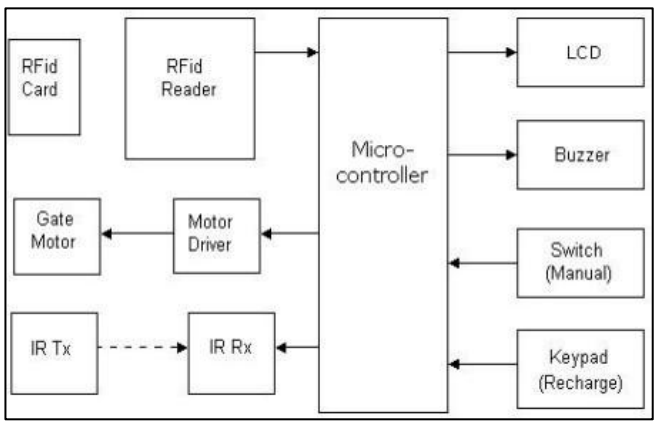
To create a schematic, just choose and position components on your page, then link them together using the wire and bus tools. Multisheet designs are supported. To convert the schematic to a PCB, click the 'Switch to Board' menu option. Layout may be modified from Schematic with a few clicks at any time. To help you better your work, design items are highlighted as you create or update them. The website provides a step-by-step instruction that walks you through the design process and makes it easy to get started.

Hardware components include a temperature sensor, a 20x4 LCD display, and supporting electronics (PCB, resistors, capacitors, diodes, switches, CT, energy metering IC, connectors, and cables).Support and Fencing WiresADXL335 Software components include Altium, Carr, and CAPHRA.

PROBLEM STATEMENT:

Manual toll collecting systems are often found guilty of embezzlement because the toll booth operators in charge of them are implicated in the theft of toll books and cash. This, and other incidents, have resulted in a collecting system that is not financially safe. The manned systems often see themselves as subject to harassment by the vehicle owners. Mostly in India, when such examples have been discovered, toll operators are physically harassed and assaulted for doing anything incorrect. The usage of ETC alone may address this issue.

BLOCK DIAGRAM & WORKING:



The microcontroller is the project's most significant component. The controller is in charge of detecting 11 peripherals and polling their status. It makes judgements for the linked devices. It is in charge of prioritizing all slaves tied to it. We utilized an ATxmega16 microcontroller. The AVR is a modified Harvard architecture processor that stores programmers and data in distinct physical memory systems with different address spaces, but can read data items from programme memory with specific instructions.

The 230 AC mains supply is fed into the transformer's primary to generate the needed voltage at the secondary. The sinusoidal input is then applied to the bridge rectifier, which turns it into a full-wave rectified output. The rectifier's output comprises ripple voltage. To eliminate the voltage, a filter circuit is employed. A ripple voltage is just a little amount of AC over DC signal. The regulator is then provided a pure direct current. The regulator's job is to provide a constant or steady DC output regardless of fluctuations in load current. The reasons for using an IC regulator are because they are diverse in operation and very affordable, with capabilities such as programmable output, current/voltage boosting, inbuilt short circuit current limiting, and thermal shutdown. The 78XX, well-known for regulation, has been utilised. The 78XX series is a three-terminal positive voltage regulator, whereas the 79XX series is a three-terminal negative voltage regulator. As the name implies, it changes the voltage level from one to another. The transformer utilised is a step down transformer that converts 230 V to + 9 V. It offers separation from the mains.

RESULTS:

Reduced lineups at toll plazas by raising toll booth service charges.Faster and more efficient service.The capacity to make payments while maintaining a balance on the card itself.Postpaid toll statements Other general benefits include decreased fuel waste and emissions due to lower deceleration rate, waiting time for cars in line, and acceleration.

REAL-WORLD APPLICATIONSAND FUTURE DIRECTIONS:

The RFID Readers located at toll booths will scan the prepaid RFID tags put on cars' windscreens, and the appropriate payment will be deducted. If the tag is removed from the windscreen, cameras installed at two locations at the toll plaza photograph the front and rear number plates. FASTag removes the need to stop and pay cash at toll plazas by automatically deducting the toll amount from a reloadable tag attached to a vehicle's windscreen. Once the tag account is enabled, this reloadable tag performs such transactions using RFID technology. ETC provides increased convenience to drivers by allowing for hands-free toll payments. Drivers may go past toll plazas at highway speeds without having to look for cash or wait in queue at toll booths.

CONCLUSION :

A design proposal for an RFID-based electronic toll collection system on a motorway was proposed. It is inexpensive, secure, allows for long-distance communication and efficiency, among other benefits. It not only enhances the expressway's transit ability, but it also raises the degree of charge technology. An electronic toll collecting system based on RFID is an excellent way to cut administration expenses and fees while also significantly reducing noise and pollution emissions from toll stations. The proposed Electronic toll collection (ETC) system incorporates real-time toll collection and an anti-theft solution. This eliminates the physical effort and delays that often occur on roadways. This toll-collection technology is environmentally sustainable while significantly increasing toll lane capacity. In addition, an anti-theft solution system module that stops any defaulter vehicle from passing is incorporated, ensuring highway security.

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