

RFID-Based Automated Toll Collection System

Group Members

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Aim:

To create an automated model of a road toll system that works on RFID

Components Required:

- 1) Arduino Uno/Nano
- 2) MFRC522 RFID Module
- 3) IR Sensor
- 4) Servo Motor RK1-1210
- 5) BreadBoard
- 6) 4×4 keypad
- 7) Jumper Wires

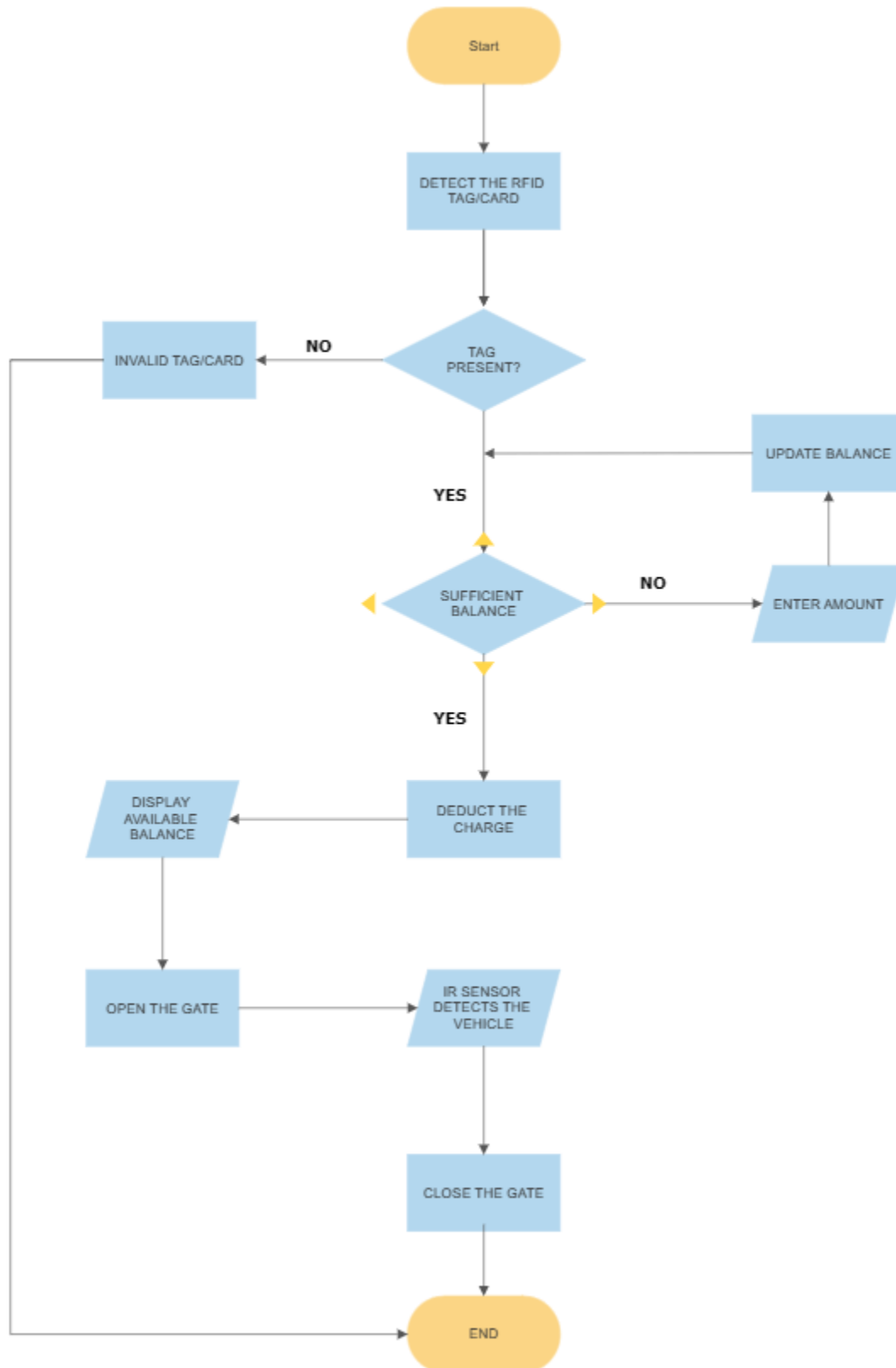
Software Required:

- 1) Arduino IDE

Introduction of the Project:

As the aim stated, we wanted to create an automated road toll system. The basic idea was to collect the toll using the RFID technology. This technology would help to uniquely identify each user, and at the toll, the processes of paying the toll tax would be automated.

Working of the Project:



Each vehicle (user) would have an RFID card which would uniquely identify the user. At the toll, the card reader would scan the card and identify whether it is a registered card or not.

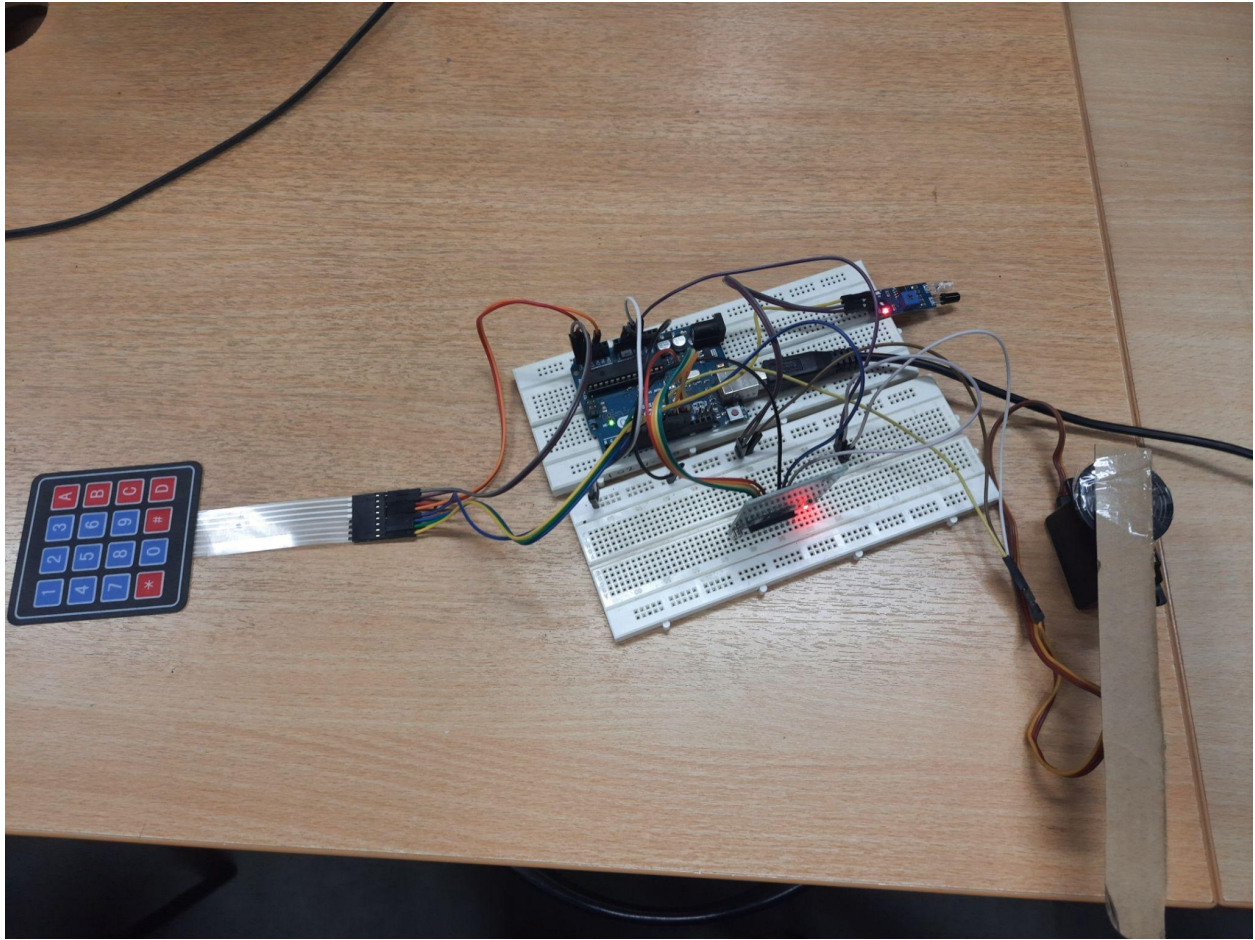
If it is, it would check for the balance. If the balance is greater than the charge applied, the charge will be cut, and the balance will be updated accordingly. If not, the user would have to add balance. For this purpose, we have added a 4x4 keypad. The user will enter the amount to be recharged through the keypad. Again the charge will be deducted, and the balance will be updated accordingly.

After the deduction, the gate, which is controlled by a servo motor, will open and let the vehicle pass. An IR sensor is placed after the gate. As the vehicle will leave, the IR sensor will detect nothing, and the gate will close.

Application of the Project:

- 1) **Automated Vehicle Identification (AVI):** The automated vehicle identification (AVI) component of this system refers to the technologies that determine the identification or ownership of the vehicle so that the toll may be charged to the corresponding consumer.
- 2) **Employee Identification in offices**
- 3) **Video enforcement system (VES):** Vehicles that pass through an electronic tollbooth without a valid electronic tag are photographed by the video enforcement system (VES), which is used for electronic toll collection. Although the implementation of these technologies results in a very high initial installation cost, there are enormous benefits that come along with such a high investment. The next section goes through these advantages.

Demonstration Picture:



Video Link:

<https://youtu.be/uf9q0bGXnR4>

Conclusion:

The proposed system can be used to develop a completely digital and smart toll collection system. In our country, manual toll plaza causes a lot of traffic. Besides, corruption in the toll plaza is an open secret. The proposed toll collection system can solve these problems efficiently.