UNIVERSITI TEKNOLOGI MARA

RFID AUTOMATIC TOLL SYSTEM

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Thesis submitted in fulfillment
of the requirements for the degree of
Diploma of Electrical Engineering

Electrical Engineering Studies
College of Engineering

FEBRUARY 2024

ABSTRACT

This paper presents a project for the development and implementation of an RFID-Automatic toll system. The problem statement focuses on the limitations of traditional toll systems, including inefficient toll collection, high operating costs, and limited data analytics capabilities. The objectives are to design and develop an RFID automatic smart toll system that integrates seamlessly with existing toll infrastructure, and second, to evaluate the system's effectiveness in terms of accuracy, efficiency, and security. By employing Arduino uno, the report aims to streamline the toll collection process, minimize human intervention, and enable real-time data analysis for effective traffic management. The methodology of this project is use Arduino uno and put IR sensor, RFID reader and keypad as the input and LCD display, motor, and LED as the output. The project has been simulated by Proteus 8 Professional software in applying every components used and observe how it is work. As result, when user pass the IR sensor, the toll gate is close. After user scan the card at RFID reader, the toll gate will be open as user pass by the next IR sensor. Opinion on future work, the system can be integrated with other smart city initiatives, such as intelligent traffic management systems, to optimize traffic flow and reduce congestion in real-time. By automating toll collection and reducing the need for manual intervention, the system improves the overall efficiency of toll operations. This leads to reduced wait times, smoother traffic flow, and enhanced user experience for motorists.

ACKNOWLEDGMENT

In finishing this thesis, I owe an enormous debt of gratitude to my supervisor, Sir Rozi Bin Rifin, his supervisorship is kind and patient. His advice and guidance as well support was invaluable to me. Also, thanks to my fellow colleagues who offered guidance throughout my final year project. Without their relentless encouragement and continuous support, this thesis would not be completed.

My appreciation goes to the Coordinators of Faculty of Electrical Engineering who willing to sacrifices their time and energy to held both offline and online workshops for the student's final year project.

Finally, I would also thank my family, parents and numerous friends who support me from afar throughout this challenging journey.

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INTRODUCTION

1.1 Background

In recent years, the rapid growth of urbanization and increasing vehicular traffic have posed significant challenges to transportation infrastructure, particularly toll collection systems. Traditional toll collection methods often suffer from issues such as long queues, manual errors, and delays, leading to traffic congestion and a frustrating user experience. To address these challenges, the implementation of intelligent transportation systems (ITS) has become increasingly important. One such solution is the RFID (Radio Frequency Identification) smart toll system, which offers an automated and efficient approach to toll collection. The RFID smart toll system utilizes RFID technology to streamline the toll collection process and minimize human intervention. RFID tags are affixed to vehicles, and as they pass through toll plazas, RFID readers automatically detect the tags and deduct toll amounts from the associated user accounts. This eliminates the need for manual toll collection, reducing congestion and improving the overall flow of traffic. Furthermore, the system enables real-time data analysis, allowing transportation authorities to make informed decisions for effective traffic management and infrastructure planning.

Traditional toll collection methods suffer from several limitations that hinder efficient traffic flow, increase congestion, and result in a poor user experience. These limitations include manual cash collection, long queues, potential for human errors, and frequent stops at toll booths. Such inefficiencies not only inconvenience motorists but also lead to increased fuel consumption, environmental pollution, and economic losses.