UNIVERSITI TEKNOLOGI MARA

E-ZDEY PETROL PUMP PAYMENT SYSTEM VIA NFC MODULE

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ABSTRACT

The landscape of petrol payment systems worldwide is undergoing drastically changes, with increasing focus on security, efficiency, and user convenience. The COVID-19 epidemic has created a pressing demand for contactless transactions, which amplifies the obstacles faced by current systems and calls for creative alternatives. This project addresses these issues by introducing an E-zdey Petrol Pump Payment System, leveraging Near Field Communication (NFC) technology and an integrated hardware-software approach. The primary goals of this project are to design a prototype for a contactless fuel pump payment system that incorporates hardware components like the ESP32, PN532 NFC Module, Infrared Sensor, and YF-S401 water sensor, and to develop a mobile application that uses NFC technology to facilitate a safe and seamless fuel pump payments system.The methodology of this project unfolds in two parts including the hardware implementation by involving the assembly of the ESP32-based hardware components, and the development of an Android-based application to complement the system. The seamless interaction between the hardware and the app forms the backbone of this innovative payment system. With the E-zdey application system, users can use their smartphone to make contactless payments using their e-wallet, which also stores all the required data, including balance, transaction history, and payment method layout. Users need to select the value into their E-zdey app and select whether to refuel in Ringgit Malaysia (RM) or Liters. The anticipated benefits of this project extend beyond immediate security and efficiency enhancements. Future recommendations include widespread adoption of NFC-enabled petrol pump systems, contributing to a more secure and streamlined fuel transaction experience.

Keywords – Contactless payment, Near-Field Communication (NFC), E-wallet, Efficiency, Security, Android-based application

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INTRODUCTION

1.1   Introduction

In the contemporary landscape of technological advancement, industries across the globe are undergoing transformative changes to meet the growing demands for efficiency, convenience, and security. The petrol retail sector, a crucial component of the global economy, is no exception to this paradigm shift. As the crossroads of digital innovation and traditional fuel dispensing methods converge, the imperative to enhance the payment infrastructure within petrol stations becomes increasingly evident. Current petrol station operations predominantly rely on traditional payment methods, such as credit and debit cards, and cash transactions. While these methods have served their purpose, they exhibit limitations in terms of transaction speed, security, and user experience. Recognizing these challenges, petrol stations are exploring new avenues to integrate cutting-edge technologies that not only streamline operations but also enhance the overall customer journey.

This project is crucial in developing a prototype that allows users to make contactless payments at petrol pumps via NFC through the E-zdey application. The significance of contactless payment methods, especially in the context of the worldwide COVID-19 pandemic, cannot be overstated. By minimizing physical contact points, this approach not only enhances transactional efficiency but also contributes to reducing the potential transmission of infectious agents in public spaces. The ever-growing ubiquity of smartphones and the prevalence of NFC-enabled devices, coupled with the user-friendly E-zdey application, have created an opportune moment to revolutionize the way customers interact with petrol stations. This thesis seeks to bridge the gap between conventional fuel transactions and contemporary digital payment methods, offering a seamless, secure, and user-friendly solution.

Through the integration of NFC technology, this project, featuring the E-zdey application, aims to facilitate swift and contactless transactions, eliminating the need for physical cards or cash. Simultaneously, the incorporation of popular E-wallet services into the payment ecosystem not only caters to the diverse preferences of consumers but also aligns with the global trend of transitioning towards cashless economies.