Universiti Teknologi MARA

AgroTani: Smart Fertilizer Selection for Agriculture Application

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Thesis submitted in fulfillment of the requirements for Bachelor of Information Technology (Hons.)
Faculty of Computer and Mathematical Sciences

February 2025

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious, the Most Merciful, all praises and thanks are due to Allah S.W.T for His blessings, and mercy upon me throughout this semester and this final year project. To begin, I would like to express my deepest gratitude to my supervisor, Assoc. Prof. Dr. Noorihan Abdul Rahman, for her invaluable guidance, support and encouragement throughout the process of completing this final year project. Her vitality, vision, sincerity, and motivation have all been tremendous inspirations to me. Without her guidance and unwavering moral support, I would not have been able to complete this project. I want to express my gratitude to all of my lecturers at the Faculty of Computer and Mathematical Science (FSKM) , especially to Dr Muhammad Firdaus Mustapha, who is my lecturer for CSP650. I feel so grateful to him for providing all of the great ideas, guidance, and ongoing support necessary to accomplish this project objective. Last but not least, I am eternally grateful to have such a fantastic family that has always been my most significant source of support and motivation. I want to express my heartfelt gratitude to my classmates and other friends who helped me through this up and down journey to accomplish this final year project. Thank you from the bottom of my heart.

ABSTRACT

Malaysia's agricultural sector plays a significant role in supporting its economy, with farming being the largest contributor. However, farmers often face challenges in selecting suitable fertilizers due to the limited access to accurate and reliable information. Farmers are still rely on the traditional methods or mouth-to-mouth recommendations, leading to inefficient fertilizer use, increased costs, and potential environmental harm. Despite technological advancements, many existing applications lack of comprehensive features that assist farmers in making well-informed fertilizer choices. The absence of the integrated tools to make decision-making, requiring farmers to manually compare multiple fertilizer types with limited information is time-consuming and inefficient. To address these challenges, this study proposes AgroTani, a mobile application designed to provide farmers with a smart and user-friendly platform for fertilizer selection, AgroTani incorporates a centralized database, QR code scanning and fertilizer calculation feature, enabling farmers to receive real-time, personalized recommendations based on their plantation needs. The application ensures accessibility by using the Bahasa Malaysia language interface, making it easier for local farmers to understand and utilize the provided information effectively. The development of AgroTani follows the Waterfall Model, a structured software development approach consisting of five phases, which are requirement gathering, system design, implementation, testing, and maintenance. This systematic methodology ensures that each phase is thoroughly completed before proceeding to the next, allowing for detailed planning and reducing potential errors in application development. Through rigorous functionality testing and system usability evaluations, AgroTani has been designed to provide an intuitive and effective solution that simplifies fertilizer selection while supporting sustainable agricultural practices. The project's outcomes demonstrate how technology can address critical issues within the agricultural sector, ensuring economic benefits in addition to environmental ones.

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CHAPTER 1

INTRODUCTION

This chapter provided an overview of the AgroTani mobile application, which aims to assist farmers in selecting the most suitable fertilizers for their plantations by offering accurate and personalized recommendations. The challenges highlighted include the lack of reliable fertilizer information, reliance on traditional farming practices, and difficulties in accessing expert guidance. The chapter outlined how the application will contribute to improving agricultural productivity and sustainability by integrating a centralized database and QR code technology to facilitate quick access to essential fertilizer information. Additionally, the research questions, objectives, scope and possible outcomes were defined, emphasizing the expected impact of the application in enhancing farmer's decision-making and promoting sustainable farming practices. Potential challenges, such as language barriers and platform compatibility, were also discussed, laying the groundwork to further exploration in the next chapter.

1.1. Background Study

As a source of both livelihood and sustenance, agriculture holds paramount importance in society. According to Chattopadhyay et al (2022), the vital role of agriculture as the backbone of nutrition cannot be understated. It provides essential energy and nutrients necessary for human survival, making it a cornerstone of a nation's well-being. The country's cash plantations such as rubber and palm oil are essential commodities grown for their high demand in both domestic and international markets. These plantations not only provide income for farmers but also contribute to meeting the global demand for these products. In 2022, Malaysia saw a notable increase of over 22 percent in the value of its agricultural exports (Topic: Agriculture in Malaysia, 2024). This growth demonstrates the robustness and competitiveness of Malaysia's agricultural industry on an international scale. With strategic planning and investment, this trend is expected to continue, further solidifying Malaysia's position as a leading exporter in the global agricultural market. In conclusion, agriculture is not only crucial for meeting basic nutrition needs but also has a significant impact on Malaysia's economic growth. The country's dependence on farming and cash plantations highlights the importance and potential of this sector in contributing