Universiti Teknologi MARA Cawangan Melaka

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i-JaMCSIIX 2023

EXTENDED ABSTRACT BOOK

Publication Date: 30 March 2024

ISBN: 978-967-15337-0-3

https://jamcsiix.uitm.edu.my

i-JaMCSIIX 2023

INTERNATIONAL JASIN MULTIMEDIA & COMPUTER SCIENCE INVENTION AND INNOVATION EXHIBITION (I-JaMCSIIX) 2023

EXTENDED ABSTRACT

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ISBN: 978-967-15337-0-3
i-JaMCSIIX
Universiti Teknologi MARA Cawangan Melaka Kampus Jasin 77300, Merlimau, Melaka

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i-JaMCSIIX 2023
International Jasin Multimedia & Computer Science Invention and Innovation Exhibition
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ExpenseEase - Living Expenses Management Mobile Application

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***Abstract*—Managing personal expenses is crucial, especially for students who often face financial difficulties. A recent survey reveals that many university students struggle with expense management due to a lack of knowledge. Although several expense management apps are available, most of them fail to meet the specific needs of students, particularly when it comes to quickly recording expenses. To address this gap, this project aims to develop a mobile application called ExpenseEase, a user-friendly and feature-rich mobile app designed to help students and young adults effectively manage their finances. Whether you are a college student or a young professional, this app is tailored to suit your unique needs and challenges when it comes to handling expenses. The project adopts a waterfall methodology, encompassing three phases: requirement, design, and implementation. In the requirement phase, a survey was conducted to gather requirements and analyze them. Subsequently, during the design phase, the interface, system, and database were designed. Finally, in the implementation phase, a functional system was developed, empowering users to effectively manage their expenses. This application utilized the capability of Optical Character Recognition (OCR) to scan receipts faster. Looking ahead, there are two potential areas for future work. First, integrating the application with financial institutions would allow students to securely link their bank accounts, providing real-time transaction updates, balance tracking, and automatic expense categorization. Second, incorporating reminders or notifications would assist users in staying on track with their financial goals and prompt them to log their expenses regularly.**

Keywords— Expenses Management, Mobile application, Optical Character Recognition

I. INTRODUCTION

The escalating cost of living in Malaysia over the past decade has significantly impacted various sectors of the population, with students being particularly susceptible to financial challenges [1]. A noteworthy consequence of this financial strain is the alarming rate at which students discontinue their studies due to economic difficulties. The lack of financial literacy is identified as a predominant factor contributing to this issue. [2] observed that 58% of college students admit to not saving money monthly, and 43% acknowledge their failure to monitor expenditures. Additionally, [3]highlighted that university students often fall into unnecessary debt due to imprudent spending habits. Addressing this financial crisis among students requires a proactive approach to managing personal finances effectively. [4] advocates for the adoption of the 50-30-20 rule, a strategy allocating 50% of income to essential living expenses, 30% to lifestyle expenditures, and 20% to savings for the future.

Historically, students tracked their daily and monthly expenses using manual methods such as personal planners or pen-and-paper systems[2], [5]. However, the advent of technology, particularly mobile applications, has revolutionized how students can manage their finances. Budget Planner Tracker, Spending Tracker, MyMoney, and Moneyfy are among the numerous mobile applications designed to facilitate expense tracking. While these apps offer convenience, a critical limitation is the manual entry of expenses, making them time-consuming. In response to this limitation, the study proposes the integration of Optical Character Recognition (OCR) technology to streamline the expense tracking process. By leveraging smartphone cameras to scan receipts, OCR technology converts text from receipts into digital records, significantly enhancing efficiency and accuracy.

In essence, this study aims to identify and address current financial challenges faced by university students through a comprehensive strategy. To gather primary data beyond existing secondary sources, a set of questionnaires has been distributed among university students. This study endeavors to contribute practical insights into financial management strategies for students in the contemporary digital era.

II. OBJECTIVES

There are three objectives in this research and all the objectives listed tend to be achieved. The objectives are as follows:

I. To gather and analyze the requirements for a living expenses management mobile application.
II. To design a mobile application for living expenses management based on analyzed requirements.
III. To develop a mobile application for living expenses management that allows user to record and manage their living expenses.

III. METHODS

This project employs the Waterfall Methodology model for its straightforward management of distinct phases, namely Requirement Gathering and Analysis, Design, and Implementation. In the Requirement Gathering and Analysis Phase, information is systematically collected from potential users, forming the basis for system feature identification. The subsequent Design Phase determines the overall system design, including user interface and database architecture, laying the groundwork for the development phase. The final Implementation Phase involves actual system development, guided by the Software Requirements Specification (SRS) and Software Design Document (SDD). This methodology ensures a systematic progression from gathering requirements to creating a fully functional mobile application for living expenses management, promoting transparency and effective project execution.

The application was designed for Android devices to ensure compatibility with various Android versions commonly utilized by university students. Developed using Android Studio with the Flutter plugin as the integrated development environment (IDE) and employing the Dart programming language, the project adopts a robust development approach. For secure user authentication, Firebase Authentication is integrated, while Firebase Firestore is utilized as the database, providing a reliable platform for storing and managing expense data. This development framework guarantees seamless functionality and user experience on Android devices, catering specifically to the preferences and needs of the target user base.

A. Requirement Gathering and Analysis

The research utilized a set of questionnaires distributed among University Teknologi MARA students to gain insights into their financial perspectives and behaviors. The findings revealed that a significant majority (93.3%) had not sought professional advice on financial management, suggesting a potential lack of access to expert guidance. Moreover, a notable proportion (63.3%) lacked a personal budget plan, emphasizing the need for comprehensive financial planning tools. Participants overwhelmingly recognized the importance of detailed budgeting for the future, with 66.6% indicating it as "Likely" or "Very Likely." Monthly income distribution showed that half of the respondents earned between RM250 to RM500, indicating a potential demand for financial management solutions tailored to this income bracket. Scholarships were the primary income source for 60% of participants. Essential expenditures were unanimously recognized, with food, rent, utility bills, and transportation being prioritized, while non-essential items like daily clothing were considered less crucial. Self-satisfaction expenditures, such as shopping and dining out, were universally acknowledged, highlighting individual preferences for personal enjoyment. The importance of saving for emergencies and the future was unanimously recognized (100%), emphasizing a collective understanding of proactive financial planning. Lastly, the majority (93.3%) expressed a keen interest in tracking monthly expenses, indicating a strong desire for financial awareness and control.

After collecting all the requirements, the survey data were carefully analyzed to find important information. The results show a need for a living expenses management app to help users budget, track income and expenses, and get financial guidance. We represented these findings visually using the use case diagram in Fig 1. It shows how different parts of the system and users relate to each other.

B. Design of Mobile Application

In the system design phase, we created the user interface using a storyboard. The storyboard helps us see how the system will look to users, giving a clear picture of the front-end design with scripting. Fig 2. shows the storyboard for the ExpenseEase mobile application.

C. Development Phase

In this phase, the application was developed according to the design produced before. To implement the OCR, an ML Kit was used. It is a tool made by Google that brings machine learning to Android. ML Kit has ready-to-use features for common mobile tasks, like recognizing text. In the ExpenseEase application, we use ML Kit to read text from pictures of receipts that users scan. When a user picks a receipt picture, ML Kit works to pull out the text and make it ready for the app to use or show. Other functionalities were also coded and assembled to build the final product.

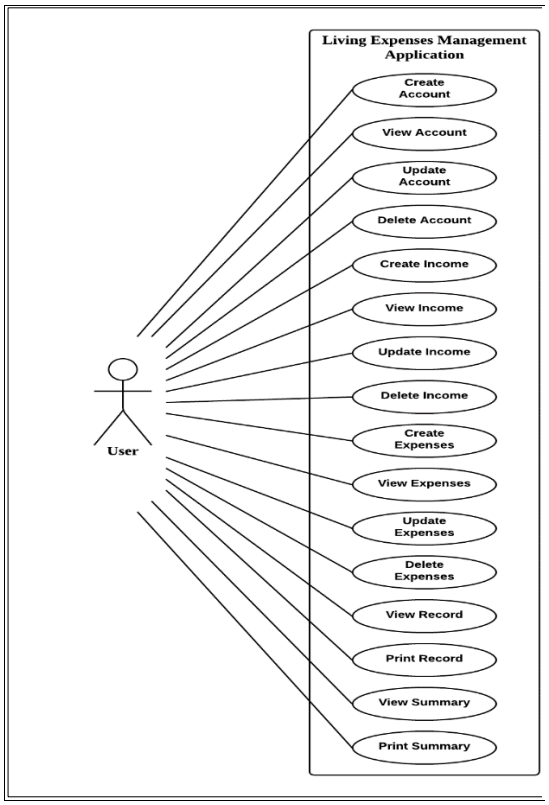

Fig 1. Use Case Diagram of ExpenseEase Mobile Application

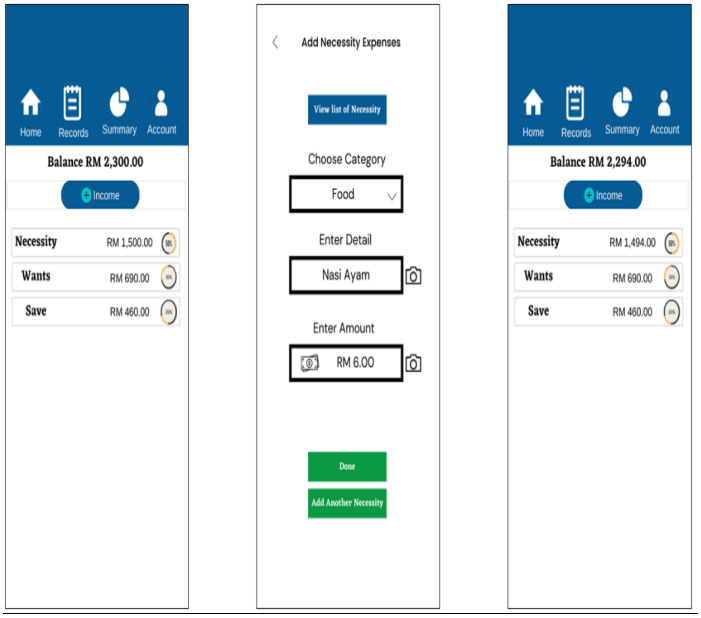

Fig 2. Storyboard of ExpenseEase Mobile Application

I. RESULTS AND FINDINGS

ExpenseEase mobile application were successfully developed after going through all the processes above. Using the application, users enter their income amount and choose its source. They then decide how to split it using predefined options: 50-30-20, 50%, 30%, or 20%. If they pick 50-30-20, the program automatically allocates 50% to necessities, 30% to wants, and 20% to savings, ensuring balanced distribution. Opting for 100% necessity spends all income on essentials, ideal for prioritizing needs. Likewise, 100% wants directs all income to desires, allowing users to focus on personal preferences. Choosing 100% save puts the entire income into savings, suitable for those emphasizing savings without trade-offs. The 50-30-20 rule offers a disciplined approach to resource management, and users can also personalize their financial experience by allocating money exclusively to necessities, wants, or savings. This is shown in Fig 3.

ExpenseEase also implemented the Google Firebase ML Kit. The ML Kit OCR API allows to integration of OCR functionality into the application. This API contains a dataset that has already been trained to enable the recognition and extraction of text from images, including scanned documents, receipts, and other text-containing visuals. By leveraging Firebase ML Kit's OCR capabilities, we can easily implement text recognition features in this app which is an Android-based platform without requiring extensive knowledge or expertise in machine learning algorithms. The OCR feature provided by ML Kit enables easy integration of text recognition capabilities into ExpenseEase without requiring extensive machine learning expertise. With this feature embedded into the ExpenseEase mobile application, it enables users to scan receipts and extract text, removing the need for users to manually type in the information.

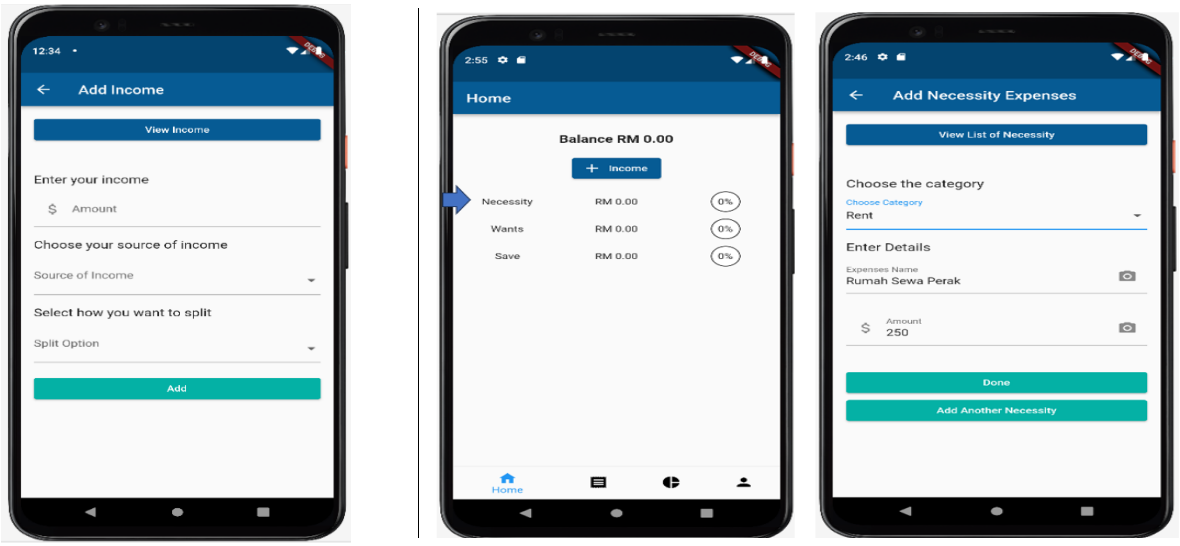

Fig 3. Interface of ExpenseEase Mobile Application

IV. CONCLUSIONS

As we progressed through the requirement, design, and implementation phases, key insights emerged to support our objectives. Notably, most respondents did not seek professional advice on managing finances, highlighting the demand for easy-to-use financial tools. Additionally, a considerable number lacked a personal budget plan, underscoring the need for tools supporting budgeting and expense tracking. Thus, incorporating the 50-30-20 rule in the ExpenseEase mobile application aims to guide users in income allocation, fostering improved financial planning and saving habits.

Throughout the project, we gained valuable insights, with a crucial lesson being the importance of understanding our target audience—their distinct needs and financial behaviors. This understanding was essential in crafting a relevant and engaging application. By delving into the audience's preferences, spending habits, and financial goals, we tailored the application to meet their specific requirements effectively. This experience highlighted the significance of thorough user research and the continuous integration of user feedback throughout development, leading to a more impactful and user-friendly application.

ACKNOWLEDGMENT

We would like to extend our gratitude to everyone involved for their contributions to this innovation and research project. Furthermore, we would also like to extend our acknowledgment to everyone who had helped directly and indirectly with completing this research.

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i-JaMCSIIX 2023

PUBLISHED BY:
i-JaMCSIIX
Universiti Teknologi MARA Cawangan Melaka
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77300 Merlimau, Melaka

Tel: 062645000
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