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I-CPEX 2022

INTERNATIONAL FINAL YEAR PROJECT COMPETITION & EXHIBITION

ICPEX 2022

Editor

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Shahidatul Arfah Baharudin
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Preface

The International Final Year Project Competition & Exhibition 2022 (ICPEX 2022) e-book is a showcase of the extended abstracts of the participants who took part in the competition. The competition was organized virtually by Universiti Kuala Lumpur (UniKL) Malaysian Institute of Information Technology on 21st October 2022 – 31st October 2022.

The e-book is primarily organized into seven categories, each highlighting different areas of technology and innovation. The categories are as follows:
a. Decision Support Systems/Embedded Systems/Information Systems
b. Data Analytics/Artificial Intelligence Applications
c. Edutainment/Games Application
d. Internet of Things/Smart Applications
e. Cybersecurity/Telecommunications
f. Social Science
g. Industrial Technology

The International Final Year Project Competition & Exhibition 2022 (ICPEX 2022) e-book is an excellent showcase of the innovative and creative projects developed by university students. The extended abstracts provide insight into the different categories of technology and innovation, and the e-book aims to inspire other students to develop innovative products that benefit society.

The competition was an excellent opportunity for students to demonstrate their creativity and problem-solving skills and compete internationally. We hope that this e-book will serve as a valuable resource for students and researchers interested in technology and innovation.

Editors

Norhaidah Abu Haris
Nik Azlina Nik Ahmad
Shahidatul Arfah Baharudin
Wan Hazimah Wan Ismail

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Re-cosmetic: A Mobile System for Cosmetic Consumers

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Abstract: In this day and age, the demand for cosmetics has escalated which means a lot of cosmetics containers have been produced. In conjunction with this, inappropriate cosmetic waste disposal has contributed to more plastic waste which takes many years to decompose. Hence, this project which includes the development of a mobile application system namely 'Re-cosmetic' is dedicated to responding to the Sustainable Development Goal 12 mission statement which is to ensure sustainable consumption and production patterns. This project involves literature review based on the existing systems, the analysis and design of the pre-production of system development, documentation on User Acceptance Test as well as overall conclusion from this project. The main features of this system include the recycle processor, newsfeed, point transfer and rewarding, cashback system as well as reminder. This system is developed using React Native, Visual Studio Code and Firebase.

Keywords: Recycle, Cosmetic, Mobile System

1. Introduction

Re-cosmetic system acts as a mobile platform to recycle cosmetic containers by bringing the recycle item to any respective cosmetic brand outlets for the convenient use of cosmetic users through the main features which includes user registration, recycle processor, newsfeed, point transfer, cashback system, point rewards and reminder. The aim of this system is to encourage the society to recycle waste of skincare and cosmetic containers in conjunction with the Sustainable Development Goal 12 in ensuring sustainable consumption and production patterns.[1]

1.1 Problems statements

- Inappropriate cosmetic waste disposal may contribute to more plastic waste especially as it takes a very long time to decompose.
- Currently, there is no existing app launched in Malaysia dedicated for cosmetics and skincare recyclable products which offers a platform for consumers to recycle their cosmetics product containers from different brands and convert them into money.

1.2 Project objectives

- To conduct a feasibility study to thoroughly understand all aspects of the proposed system.
- To provide a working application which helps consumers recycle their cosmetic product containers from different brands.
- To provide information on the items which can be recycled and provide an insight on the environmental issues.
- To produce a report which includes surveys and usability testing.

1.3 Project scope and limitations

The mobile application will only cover the Re-cosmetic User View which users will be able to register accounts, perform recycling processes within the mobile application, read at the newsfeed to get information and will benefit from the application through recycle activity which will give them money in return for each recycle transaction. The target audience is cosmetic products consumers among the young adults and middle-aged adults ranging from eighteen to fifty-five years old who currently live in Malaysia.

Some limitations on this application is that this application can only be supported by the iOS operating system. Next, the application does not have an update profile function. Other than that, as for the point transfer function, it only allows users to transfer to one bank account only.

2. Materials and Methods

2.1 Requirement engineering

The development approach that is used in Re-cosmetic system development is agile software development which involves the constant interactions and collaboration between developer team and user test participant over development process and tools. This approach focuses on working on software development and prototyping by responding to change rather than extensive documentation. Basically, an agile software development approach has been chosen since it allows the developer team to improve the application and features according to users' satisfaction which will ensure the quality of the application system. It is more flexible to use agile methodology since the development is adopted at any phase of the process. Other than that, there will be more productivity and transparency as the developer team will need to continuously communicate with user test participants in achieving optimal project output which additionally can reduce the potential risk of missing goals.

Additionally, user requirements are important in order to develop a user friendly system application that fits the needs of users. Therefore, a survey has been conducted to collect the requirements. For the result of the questionnaire, there are 40 respondents who completed the questionnaire. For the demographics part, 70% of the respondents are female while 30% of the respondents are male. Majority of the respondents were aged between 18 to 27 years old which takes 80% from the overall and most of the respondents are students.

2.2 Development requirement

i. Development Environment: Visual Studio Code with Node.Js for Windows.
ii. Open Source Library: React Native framework and Expo
iii. Database Configuration: Google Firebase

2.3 Functionality requirement

These diagrams provide an overview regarding logical design which specifically on the system analysis and design diagram to provide enlightenment concerning the system's functions and modules that will be the reference and guidance in the completion of this project.

i. Use case diagram (user view)

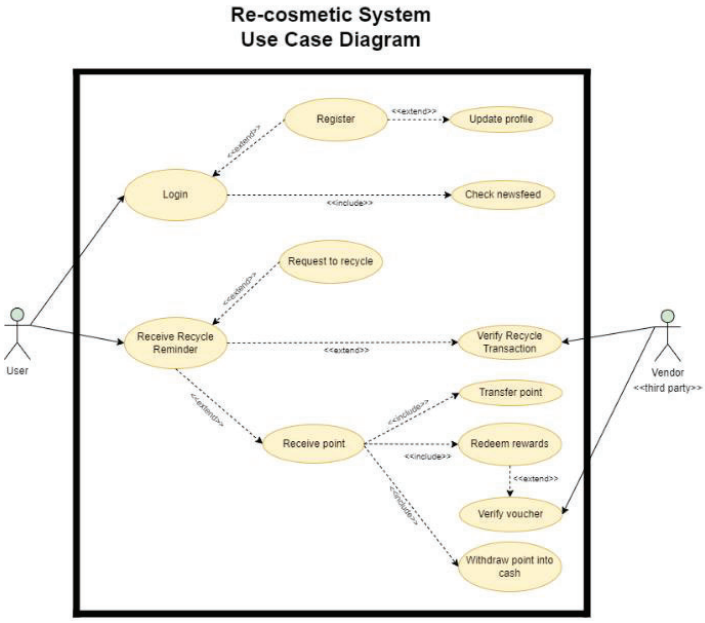

Figure 1: Use case diagram

ii. Class diagram

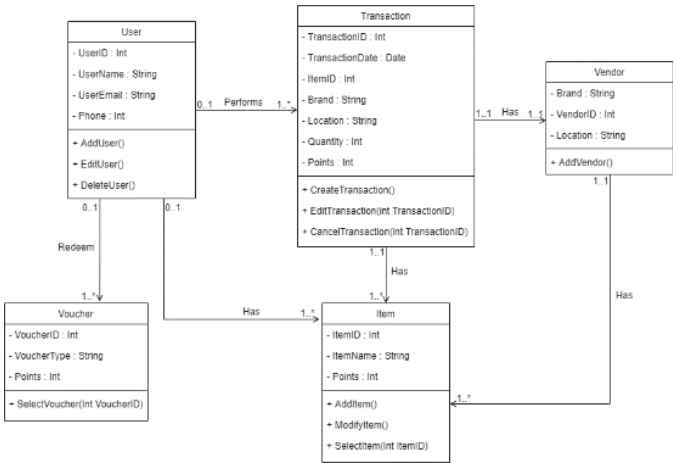

Figure 2: Class diagram

iii. Sequence diagram

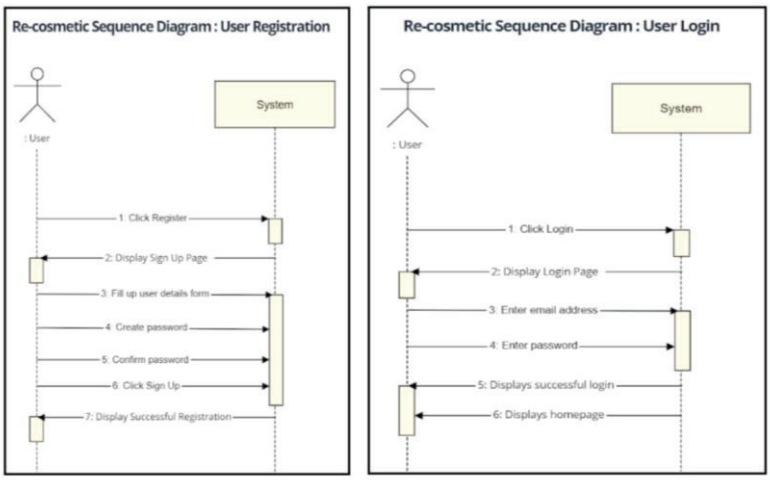

Figure 3: Sequence diagram for registration and user login

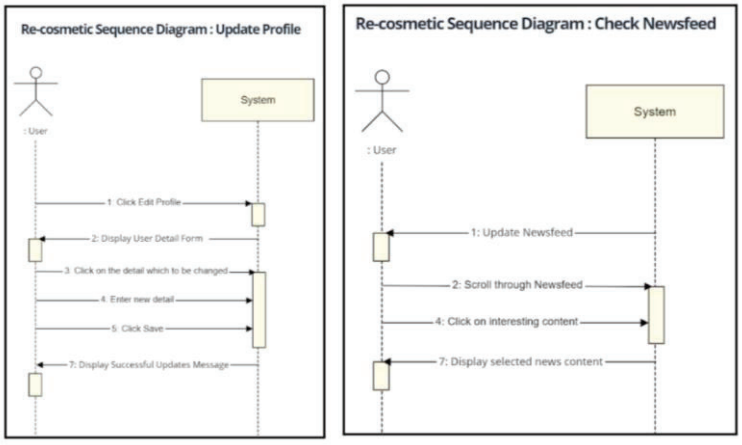

Figure 4: Sequence diagram for update profile and check newsfeed

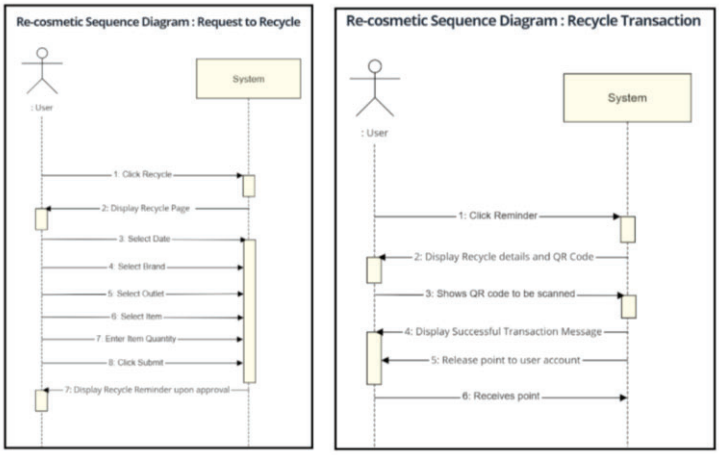

Figure 5: Sequence diagram for recycle request and recycle transaction

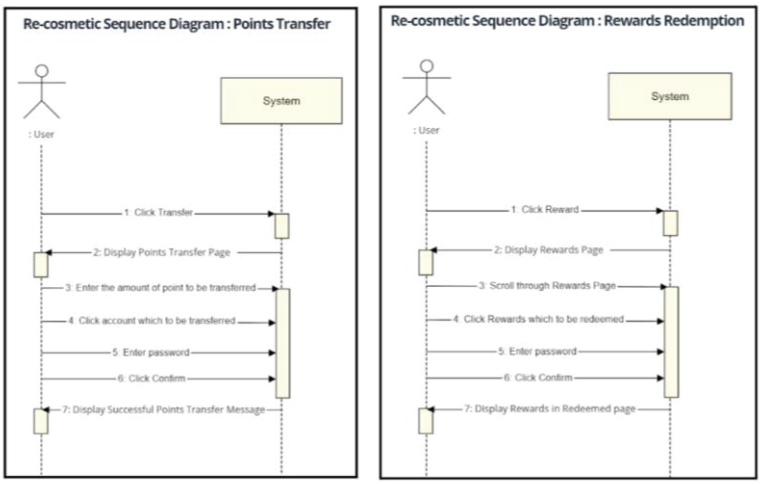

Figure 6: Sequence diagram for points transfer and rewards redemption

iv. Activity Diagram

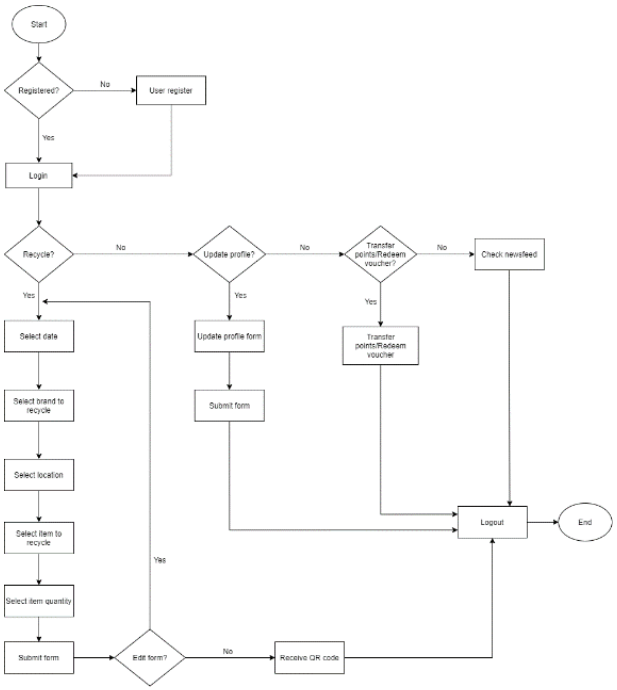

Figure 7: Activity diagram

3. Results and Discussion

3.1 Literature Review

A thorough review has been performed on existing applications that have the same concept as the proposed application. The three applications that are currently available and have been reviewed are Recircle, Recycle For Life and Trash2Treasure which the results has been summarised in **Table 1**.

Firstly, Recircle is an application that allows users to recycle items that have been specifically categorized. [2] It is simply designed to provide convenience for the users with door-to-door service which will allow the buyers to pick-up users' recycled items. Through Recircle, users may alternatively send the recycle items to the nearest recycle center which can be located using the recycling center locator feature offered by Recircle. This application offers some functionalities and features which includes user registration, Recycle Module, Location Module, Announcement Module, Point-transfer Module, History Module, Reward Module and Cash-out module.[3]

Recycle For Life (RFL) is basically a recycling program that rewards cash through the use of a smartcard which is dedicated for potential users who are living in Kedah and Perlis.[4] With this initiative, this mobile application is simply designed to allow users to get real-time transaction history anytime and anywhere. The smart card will allow users to purchase goods at selective outlets. Additionally, users will also be notified for every collection day through this mobile application. This system offers some functionalities and features which include user registration, Recycle Cash Rewards Tracking Module, Virtual Card Module and Payday Reminders Module.[5]

Thirdly, there is also another application which provides a related concept of recycling known as Trash2Treasure. It is an application which applies the recyclables-buyback process. This application locates recycling centers according to specific recycle items which are specifically categorized on recyclable materials, household e-waste, food waste and reusable materials. It also allows the user to exchange recyclables for cash or alternatively valuable items. Additionally, users can learn how to segregate waste in a fun way. This system offers some functionalities and features which include Location Module, User Registration, Recyclables-Buyback Module, Trash To Goal in-app mini game, Resource Bank Module and Events Module.[6]

These existing applications do have their own pros and cons. However, there are features and functionalities that are not in the application. Additionally, none of the three applications are meant for cosmetics recyclable containers. Therefore, the Re-cosmetic Project provides a similar concept as these applications, which is to recycle waste. However, it is specifically for cosmetic and even skincare waste containers.

Table 1: Literature Review Summary

Features	**Application**			
	Recircle	**Recycle For Life**	**Trash2Treasure**	**Re-cosmetic**
Recycle Process	Available	Availables	Not Available	Available
News Feed	Available	Not Available	Available	Available
Points Transfer	Available	Not Available	Not Available	Available
Cashback System	Available	Available	Not Available	Available
Points Reward	Available	Available	Not Available	Available
Reminder	Not Available	Not Available	Available	Available

3.2 Results

Figure 8 shows the Login and Sign up screens, which will appear when users want to log into the application and register an account respectively. The request to recycle function is displayed in **Figure 9**, while **Figure 10** shows the withdrawal and transfer of points functions. **Figure 11** shows the redemption of rewards feature and **Figure 12** shows the reminders of the recycle requests made by users.

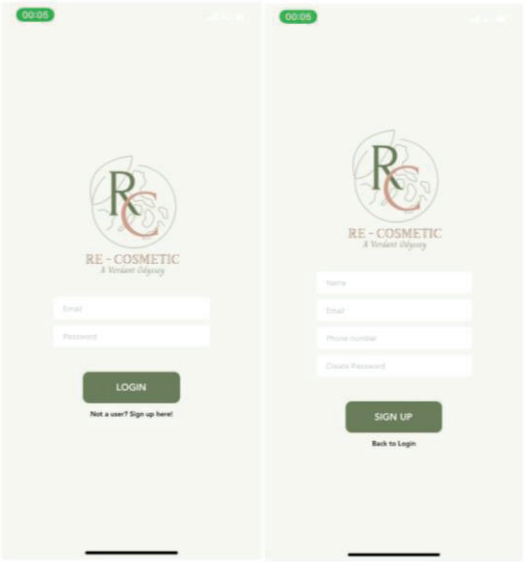

Figure 8: Login and sign up page

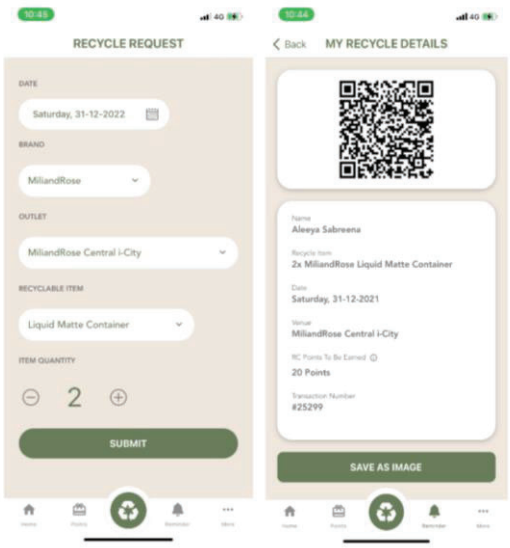

Figure 9: Recycle request and recycle details page

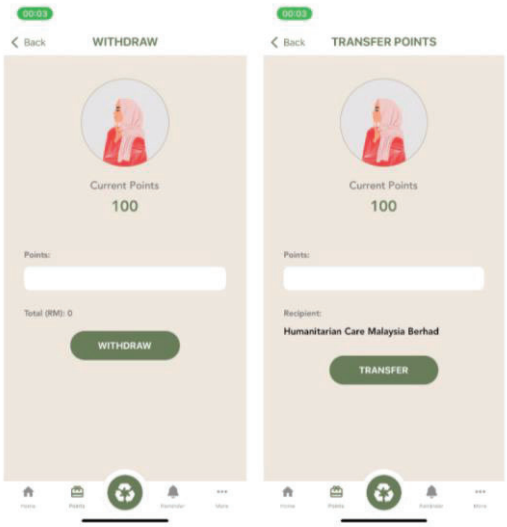

Figure 10: Withdraw and transfer page

Figure 11: All rewards and my rewards page

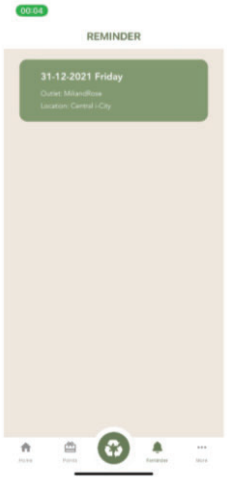

Figure 12: Reminder page

3.3 Discussions

The results and discussion from the UAT conducted are based on the test cases and acceptance criteria change. Additionally, user testers have provided some feedback which includes the user interface design and color scheme which suits the theme of cosmetic and recycle which makes it can be used efficiently with a minimum of fatigue. There is also consistency on the application components such as the buttons and fonts. Other than that, user testers find that the system is user friendly, easy and simple to use since most of the pages are understandable at the first glance. Next, user testers opined that it does not take much time to make a recycling request since it only asks the user to pick through the picker which therefore makes the application process really efficient. However, there are some improvements that can be made based on user testers' suggestions and feedback which will be prioritized according to the highest priority level. Therefore, the enhancements which are to be improved in this project based on tester's improvement suggestions include changing the 'beautiful' to the user's name or another word which suits both male and female gender on the Home page, fix the navigation on the Submit and Confirm button on the Recycle Request page, retrieve user input to display details on the My Recycle Details page, provide some instructions to the user to make the user understand the features of the page (i.e the points conversion to RM) on the Withdraw page, provide some instructions to the user to make the user understand the features of the page (i.e the points conversion to RM) on the Transfer Points page, navigate the voucher to the right voucher details on the My Rewards page and add Edit Profile feature.

In a nutshell, user experience is basically the feelings of users when they use a product or technology. The user experience can be improvised by using the method of user-centered design in which a product is designed according to users' needs and mind behavior. Based on the Test Cases and Acceptance Criteria Change, the interfaces should be functional, easy to use and intuitive. By applying these principles, it will help in preventing mental distress and may help in creating interface designs that are accurately read and understandable by the user. Apart from that, any unintended visual relationships can be avoided by understanding and screening designs for the interfaces. Some methods that could be conducted in strategies to improvise system design is by running a user test on a prototype repeatedly until getting the finalized system design which satisfies the users' needs. In conclusion, running a user test on a prototype is a good strategy to ensure that a clear hierarchy in an interface layout and visual flow is created which results in creating a better experience for the user through the future enhancement of the Re-cosmetic system.

4. Conclusion

In conclusion, the Re-cosmetic Project has managed to be done by using an iterative development methodology. It really helps to ease the tasks involved to complete this project. Additionally, it helps the project to be done in a very systematic way. The user acceptance test indicates that most of the users, especially among women, find that the application is useful. They believe that the application could help them to recycle their used cosmetic containers and thus help the environment. They also suggested some ideas for future enhancement that can be done with the application.

As for the future enhancement, there are some improvements suggestions that have been considered such as applying security mechanisms, include push notifications for reminders feature, adding list of brands and allow user to upload picture of products on the recycle request feature, enhance the point transfers by allowing user to make transfers to other Re-cosmetic users, enhance the withdrawal function by allowing user to choose withdrawal options, adding recycle history feature as well as adding new feature which allows user to track product originality. To sum up, the Re-cosmetic system is expected to grow in the future since some research regarding the potential and supplementation of the system is already being undertaken in order to extend and enhance the features and functionalities covered in the system development until now.

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[6] Trash2Treasure (Penang Green Council, 2016)

The International Final Year Project Competition and Exhibition (ICPEX) 2022 e-book features compelling extended abstracts from students who virtually participated in the competition. This publication showcases numerous original and novel concepts submitted by talented participants from diverse Malaysian universities. By submitting videos and extended abstracts, these students have proven they can produce high-quality innovative technologies as part of their final-year projects.

The publication of this e-book aims to serve as a valuable reference and inspiration for future final-year students, encouraging them to participate in any upcoming Universiti Kuala Lumpur, Malaysian Institute Information Technology (UniKL MIIT) competition.

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