Information Management and Business Review (ISSN 2220-3796)
Vol. 16, No. 3S(a), pp. 1120-1137, Oct 2024

Flavors of Sarawak: Exploring Authentic Home-Cooked Recipes Through A Mobile Application

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Abstract: This project delves into the exploration of authentic home-cooked recipes from Sarawak, presented through a mobile application with augmented reality features. The motivation is to showcase the rich and diverse Flavours of Sarawak's culinary traditions, with a primary focus on ensuring a user-friendly and engaging experience for the audience. Rapid Application Development (RAD) methodology was utilized, which consists of four (4) main phases: Requirements Planning, User Design, Construction, and Cutover. The outcome of the study: it was found that the Flavours of Sarawak mobile application received a commendable average SUS score of 80.4, indicating a strong level of usability and user satisfaction. This score surpasses the threshold for an above-average user experience, reinforcing the application's success in effectively promoting awareness of Sarawak's diverse flavors. The high SUS score also suggests the application's potential to engage users and convey essential information about Sarawak's culinary heritage in an accessible manner. In terms of future work(s), the inclusion of more food models, particularly those showcasing iconic Sarawak dishes like "Kek Lapis Sarawak," aims to attract more users and foster an increased interest in exploring various facets of Sarawak's culinary traditions.

Keywords: *Flavors of Sarawak, home-cooked recipes, culinary traditions, mobile application, augmented reality*

1. Introduction

According to Ting et al. (2017), Sarawak's rich culinary heritage is deeply rooted in its history, where the native groups, influenced by the vast forested areas and pre-independent lifestyles, crafted traditional foods using natural resources like wild game, fish, shoots, stems, leaves, roots, and bark. These culinary treasures, sourced from the forest, have played a pivotal role in shaping the distinctive gastronomic tourism culture of Sarawak. However, as highlighted by Sageng et al. (2020), there is a notable absence of studies validating the cooking processes, techniques, and ingredients employed in Sarawak's ethnic foods. The lack of a standardized approach to preparing Sarawak Ethnic cuisine poses a potential threat to the culinary heritage of each native group, subsequently impacting the state's tourism landscape (Sageng et al., 2020). The culinary treasures, deeply rooted in Sarawak's ethnic communities, are susceptible to alterations and transformations due to the ongoing waves of modernization. While some changes are expected in response to modernization, the concern arises when these changes encompass the entire food preparation and serving system. If such comprehensive alterations occur, they may significantly impact the understanding of traditional cooking methods for the young and later generations (Langgat et al., 2011). The assumption is that a lack of standardized methods may lead to a loss of knowledge regarding the authentic preparation of these dishes among the younger generations.

To preserve the cooking recipes and traditions of Sarawak natives, a mobile application with augmented reality features has been proposed. The home-cooked recipe mobile application has significant potential to make a positive impact on the lives of users. First, it will serve as a library where users can access a wide range of home-cooked recipes, which can inspire them to cook more meals at home and users can prepare healthier meal options. The traditions or methods of cooking also will be provided by the application. This can lead to a healthier lifestyle and can be helpful for people who have dietary restrictions, such as vegans, vegetarians, or those with food allergies. A home-cooked recipe mobile application can provide users with quick and easy recipes that can be made in a short amount of time. This can be helpful for busy parents, students, or working professionals who want to eat healthy meals at home. Furthermore, cooking at home can be a more cost-effective alternative to eating out, but many people may not know how to prepare meals that are both affordable and tasty. A home-cooked recipe mobile application can provide users with recipes that use inexpensive ingredients and help them save money on food preparation.

2. Literature Review

This section provides the literature review of the project related to Sarawak ethnic cuisine, home-cooked recipes, mobile applications, recommended techniques, and existing applications with comparisons related to the study.

Overview of Sarawak

Sarawak, also known as Bumi Kenyalang (Land of the Hornbills), stands as one of the two Malaysian states in Borneo (Langgat et al., 2011). Popular among both Malaysians and international tourists, Sarawak boasts a captivating cultural diversity with over 30 ethnic groups, such as the Iban, Bidayuh, Malay, Melanau, Chinese, Sebob, and Orang Ulu (Attila, 2007; Langgat et al., 2011). In terms of cuisine, each native group in Sarawak possesses a unique culinary treasure, emphasizing the role of food in representing cultural identities, with each ethnic group having its own culinary story (Langgat et al., 2011; Sageng et al., 2020).

Ethnic Food

According to Mohd et al. (2020), some researchers believe that understanding culture, society, and identities can be achieved by looking at food. In this context, food holds significant cultural importance for the different native groups in Sarawak, each having its unique delicacies. Ting et al. (2017) point out that ethnic foods, which come with stories and histories, are now appreciated for cultural reasons rather than just survival. For instance, according to Mohd et al. (2020), the Iban community is known for "tubu" (stems), "tuak" (rice wine), and "pansuh" (bamboo-cooked meat). Similarly, the Melanau people are associated with "tebaloi" (Sago palm crackers), "sagu" (Sago palm extract), and "umai" (raw fish with lime juice). The Orang Ulu community is recognized for "garam barrio" (Highland's salt), "kikid" (broth), "tengayen" (local young leaves), and "urum giruq" (pudding). Additionally, as per Mohd et al. (2020), the Malay population is famous for the "kek lapis Sarawak" (layered cake of Sarawak). However, according to Ting et al. (2017), ethnic food involves everyday food and eating at home, with variations defined by ethnic groups, regions, cultures, and religions.

Mobile Platform

The smartphone, which is today's most iconic product, is equipped with a powerful operating system, storage space, and execution identical to that of a personal computer (Zhang et al., 2019). Mobile app development has grown exponentially since the opening of the iPhone AppStore in 2008 (Elmahdi0 Bourahla & Bourahla, 2020). Since 2008, device manufacturers have created stores for other mobile devices, including Android, BlackBerry, Nokia Ovi, Windows Phone, and more. However, the Apple platform is the only available platform in this project for the mobile application to be developed because the smartphone that will be used to showcase the mobile application is an iPhone which is the device that the developer owns. iPhone with the iOS operating system is one of the most widely used devices in the world (Studiawan et.al., 2022). iOS is developed by Apple, a company that also makes iPhones, iPads, and MacBooks (Taufani et al., 2019). The iOS platform is the world's first and most advanced mobile operating system, redefined and constantly updated to ensure the best possible user experience (Novac et.al., 2019).

Selection of Extended Reality Technique (XR) for Mobile Application

Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) are three distinct immersive technologies that offer different user experiences and are being considered for this project. Table 1 shows the difference between VR, AR, and MR. For this project, augmented reality is chosen to be implemented. Augmented reality (AR) has emerged as a promising technology to enhance home recipe applications. By overlaying digital content in a real-world cooking environment, augmented reality can provide users with an interactive and immersive cooking experience. AR-enabled recipe apps can offer several benefits to home cooks. First, AR can display step-by-step instructions directly in the user's field of vision, eliminating the need to constantly refer to cookbooks or digital screens. Users can follow instructions hands-free, improving efficiency and reducing the risk of mistakes. Additionally, AR can provide real-time guidance and support. Through object recognition and tracking, augmented reality can identify cooking ingredients and tools, providing relevant information such as nutritional information, alternative ingredient choices, and cooking tips. This feature enhances user knowledge and allows customization based on dietary preferences or restrictions.

Table 1: Difference between VR, AR, and MR

	Virtual Reality (VR)	Augmented Reality (AR)	Mixed Reality (MR)
Environment Description	An entirely generated scene (image and sound) by computer using some headset to immerse in this virtual world and make a feeling the user transport in this world	A merge between real-world objects and computer graphics objects in the same scene using headsets or mobile applications makes a feel that the real world has new elements.	A merge between real-world objects and computer graphics objects in the same scene using headsets or mobile applications makes a feel that the real world has new elements.
Awareness	Rendering the virtual world makes it hard to distinguish between the real world and the virtual world.	Rendered objects can be identified; it's like a floating UI in the real world.	Rendered objects are hard to identify from real objects.
Interactivity	It's users and virtual world interaction only. There is no interactivity between the virtual world and the real world.	The primary interaction between users and virtual objects may have some interaction between the real world and virtual objects.	It is mainly focusing on blending the interactivity between virtual objects, the real world, and user actions.
Remote Collaboration	Remote users can interact with applications using avatar representations.	The primary interaction between users and virtual objects may be some interaction between the real world and virtual objects.	It can be achieved using avatar representations. It also adopts remote interaction with the real world like remote surgery.

(*Source*: Elawady et al., 2022)

AR can also facilitate discovery and recipe discovery. By using augmented reality to visualize dishes before they are prepared, users can preview the final presentation and make informed decisions about their culinary creations. This visual feedback can enhance creativity and inspire experimentation in the kitchen. All in all, augmented reality has the potential to revolutionize home recipe apps by making cooking more accessible, interactive, and fun. With the continued advancements in AR technology, we can expect an increase in the integration of AR into the cooking experience, allowing home chefs to explore flavors, techniques, and cooking adventures.

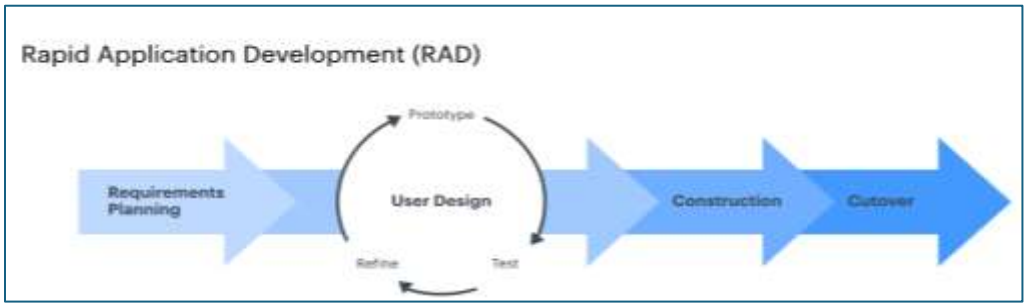
According to Balasubramanian et. al. (2022), the integration of Augmented Reality (AR) and Virtual Reality (VR) as marketing communication channels within the tourism and hospitality industry is gaining attention and momentum to transform and enhance customer experience. The hospitality industry constantly needs to create new experiences in their marketing communication tools compared to traditional video commercials due to the fast-changing world and consumer behavior during the global pandemic and outbreak. In the hospitality and tourism industry, integrating augmented reality and virtual reality will benefit from creating an immersive, healthy, and entertaining experience as it enhances how customers or travellers will access the information in their respective context with the enhanced mobile capabilities (Balasubramanian et. al., 2022). The author hopes that AR products that showcase Sarawak cuisine will be produced more in the coming years.

3. Methodology

Rapid Application Development (RAD) is used as the mobile application development methodology for this project. Rapid Application Development (RAD) is a popular agile project management strategy in software development. The main advantage of the RAD approach is the speed of project execution, making it an attractive choice for developers working in a fast-paced environment such as software development. This rapid speed is due to RAD's focus on minimizing the planning phase and maximizing prototype development. By reducing planning time and emphasizing prototype iterations, RAD enables project managers and stakeholders to accurately measure progress and communicate in real time on progress on issues. Subject or change. This leads

to greater efficiency, faster development, and effective communication. Figure 1 shows Rapid Application Development (RAD) Methodology.

Figure 1: Rapid Application Development (RAD)

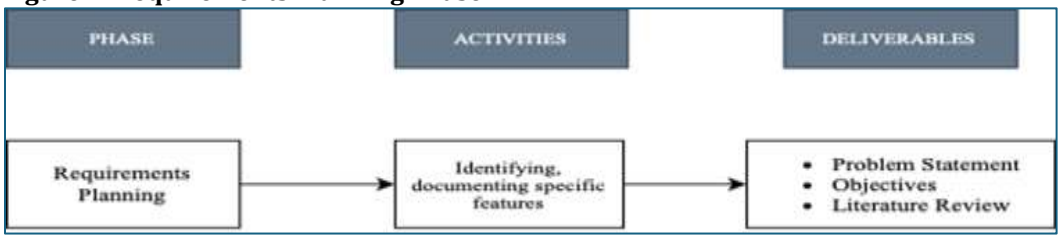


(*Source:* Dennis, 2023)

Description of RAD Phases in Project Implementation
In this section, the RAD phases that have been implemented are described.

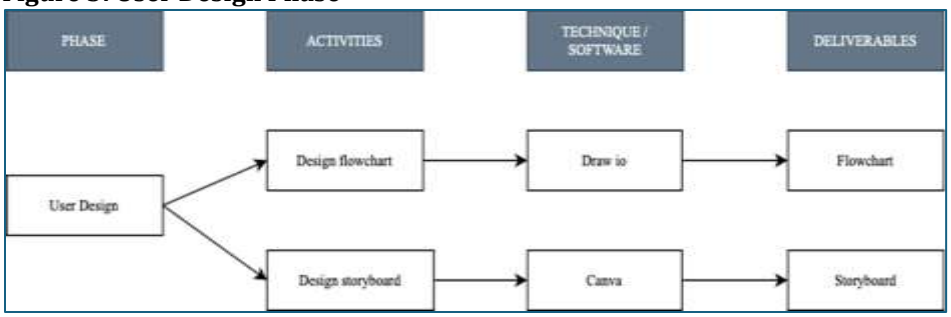
Requirements Planning: Requirements planning for your home recipe project with augmented reality involves identifying and documenting specific features and functions that you want to incorporate into the app. This includes defining the desired user experience, recipe storage, ingredient recognition, nutritional information displays, and interactive cooking demonstrations. By carefully planning requirements, you ensure that the application meets its goals and matches user expectations, facilitating efficient development and successful implementation of real projects. Figure 2 shows the process involved in the requirements planning phase.

Figure 2: Requirements Planning Phase



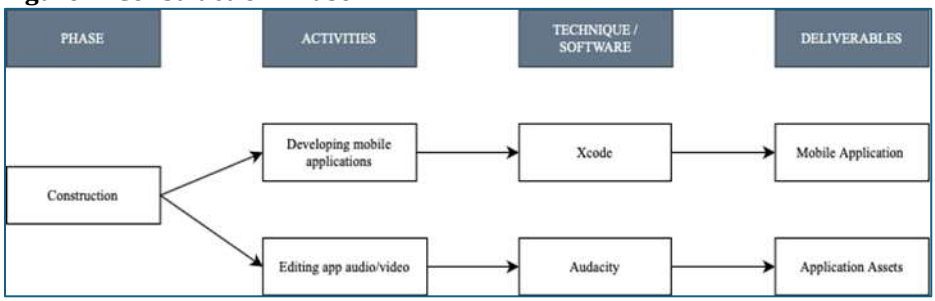
User Design: The user design phase consists of prototypes, refining, and testing. Designers create storyboards, flowcharts, prototypes, and models to visualize an application's structure, layout, and interactions. It also applies intuitive design principles to ensure a consistent and aesthetically pleasing user interface. The design phase allows the user to test and refine the design to implement the final design, ensure AR features are effectively integrated, improve usability, and provide a pleasant dining experience. Overall, storyboards and flowcharts are among the major design presentations created during this phase. Figure 3 shows the process involved in the user design phase.

Figure 3: User Design Phase



Construction: The phase of building your homemade recipe project with augmented reality goes through the development and implementation of the real-world app. In this phase, the software is built to the defined requirements and design specifications. Developers write code, integrate the necessary ingredients, and create augmented reality features like ingredient recognition, recipe displays, and interactive cooking demonstrations. Figure 4 shows the process involved in the construction phase.

Figure 4: Construction Phase



Cutover: The cutover phase is when the final product is ready for deployment. The finished product of this project will be tested by users from the stated project scope. User feedback is very important for improvement to make the app work as expected. Therefore, a questionnaire related to the mobile app experience will be collected. The System Usability Scale (SUS) proposed by Brooke in 1986 is a widely used questionnaire to assess the usability of a system, such as an operating system-based software interface. Standards, web, and mobile applications (Sevilla-Gonzalez et al., 2019). Figure 5 shows the example of The System Usability Scale (SUS).

Figure 5: The System Usability Scale (SUS)

	The Computer System Usability Questionnaire Version 3	Strongly agree 1	2	3	4	5	6	Strongly disagree 7	NA
1	Overall, I am satisfied with how easy it is to use this system.	○	○	○	○	○	○	○	○
2	It is simple to use this system.	○	○	○	○	○	○	○	○
3	I am able to complete my work quickly using this system.	○	○	○	○	○	○	○	○
4	I feel comfortable using this system.	○	○	○	○	○	○	○	○
5	It was easy to learn to use this system.	○	○	○	○	○	○	○	○
6	I believe I became productive quickly using this system.	○	○	○	○	○	○	○	○
7	The system gives error messages that clearly tell me how to fix problems.	○	○	○	○	○	○	○	○
8	Whenever I make a mistake using the system, I recover easily and quickly.	○	○	○	○	○	○	○	○
9	The information (such as online help, on-screen messages, and other documentation) provided with this system is clear.	○	○	○	○	○	○	○	○
10	It is easy to find the information I needed.	○	○	○	○	○	○	○	○
11	The information provided with the system is effective in helping me complete my work.	○	○	○	○	○	○	○	○
12	The organization of information on the system screens is clear.	○	○	○	○	○	○	○	○
13	The interface* of this system is pleasant.	○	○	○	○	○	○	○	○
14	I like using the interface of this system.	○	○	○	○	○	○	○	○
15	This system has all the functions and capabilities I expect it to have.	○	○	○	○	○	○	○	○
16	Overall, I am satisfied with this system.	○	○	○	○	○	○	○	○

**The "interface" includes those items that you use to interact with the system. For example, some components of the interface are the keyboard, the mouse, the microphone, and the screens (including their graphics and language).*

(Source: Barnum, 2020)

4. Results and Discussion

In this section, the overall results of the mobile application design, development, and testing are discussed. The project's efficacy was guaranteed through a step-by-step approach, starting from requirement analysis to evaluating the final product during development and implementation.

Mobile Application Design and Development

It's crucial to precisely define and understand all the components related to the initial work to ensure developers have the right tools and resources. For the development of this mobile application, it's essential to use suitable hardware to ensure a smooth process and prevent complications. Additionally, it's recommended to utilize the developer's latest hardware to expedite the development process and avoid unnecessary loading delays. Table 2 shows the hardware requirement for this mobile application and Table 3 shows the software requirements for the application.

Table 2: Hardware Requirement

	Feature	Requirement
1	Device	iPhone 12
2	iOS Version	17.0.3
3	Memory	128 GB

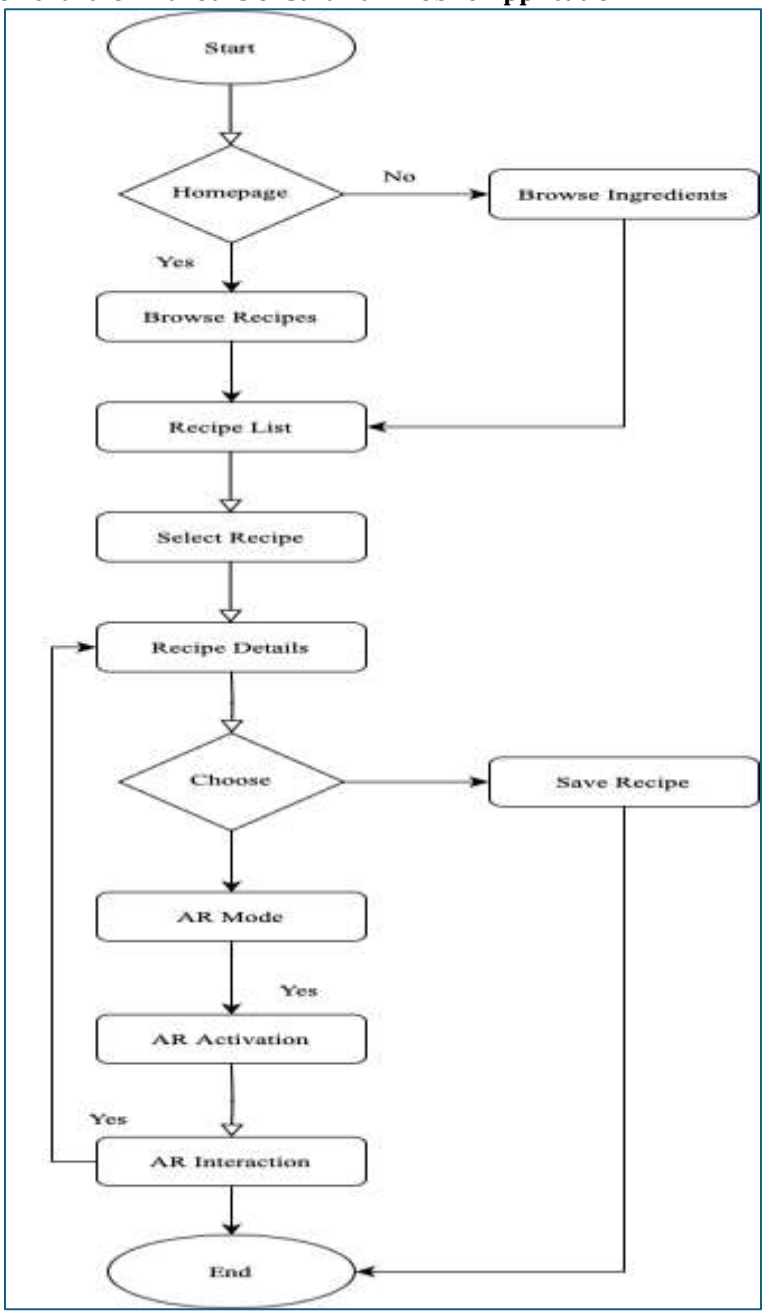
Table 3: Software Requirements

	Software	Description
1	XCode	To develop an iOS mobile application
2	Blender	To create the augmented reality 3D
3	Reality Converter	To convert, view, and customize USDZ 3D objects on Mac
4	Canva	To design the launch screen for a mobile application

Mobile Application Process Flowchart

Figure 6 is the process flowchart for the Flavours of Sarawak Mobile Application. It encompasses 9 processes, and 2 decisions to cover its recipe information management and augmented reality features.

Figure 6: Process Flowchart for Flavours of Sarawak Mobile Application



Mobile Application Storyboard

The storyboard has a dual role: building the app interface and guiding developers in the development process. It's been improved from the earlier low-fidelity version, offering a user-friendly overview and visual representation of the app's potential appearance. The storyboard depicts application functionality, with each scene showing the layout and operations. Figure 7 – 13 shows the storyboard of the project.

Figure 7: Launch Screen

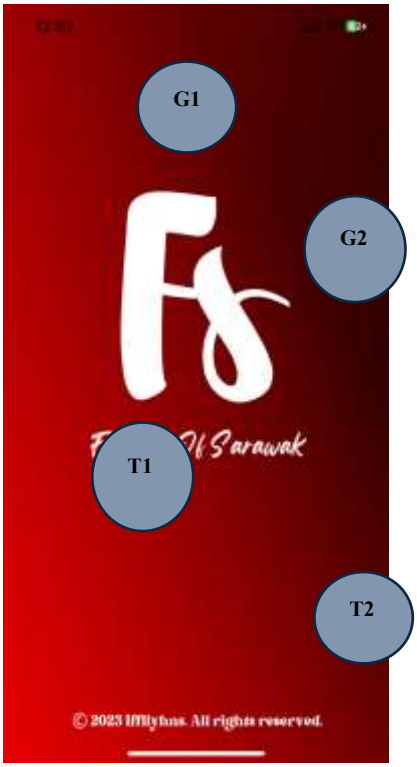
Scene 1: Launch Screen

Description
When a user clicks the application, this launch screen will automatically appear for a few seconds before it brings you to the Main Home page.
Multimedia Elements
T (Text), G (Graphic), A (Animation), S (Sound), B (Button)
T1: Title **T2: Credit Title** **G1: Background Image** **G2: Logo Image**

Figure 8: Main Home

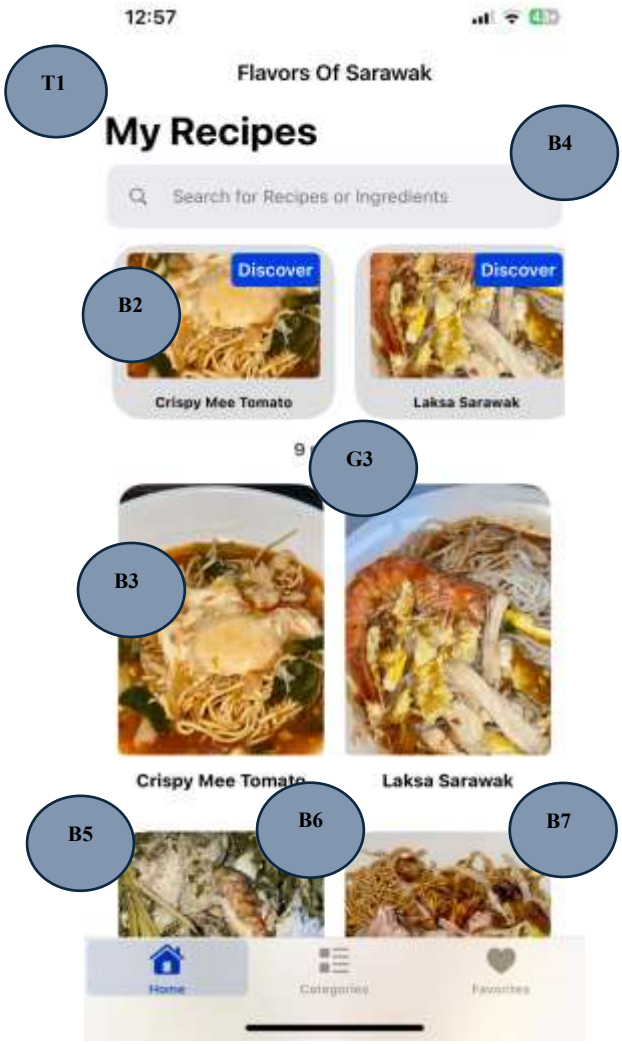
Scene 2: Main Home

Description
For this Main Home page, users can interact with the search bar. Moreover, the user can click the food recipe and it will bring the user to the "My Recipes" page.
Multimedia Elements
T (Text), G (Graphic), A (Animation), S (Sound), B (Button)
T1: Title **B2: Recipe List Button** **B3: Recipe Button** **B4: Search Recipes / Ingredients** **B5: Home Page Button** **B6: Categories Page Button** **B7: Favorites Page Button** **G3: Food Recipe Image**

Figure 9: Search Menu

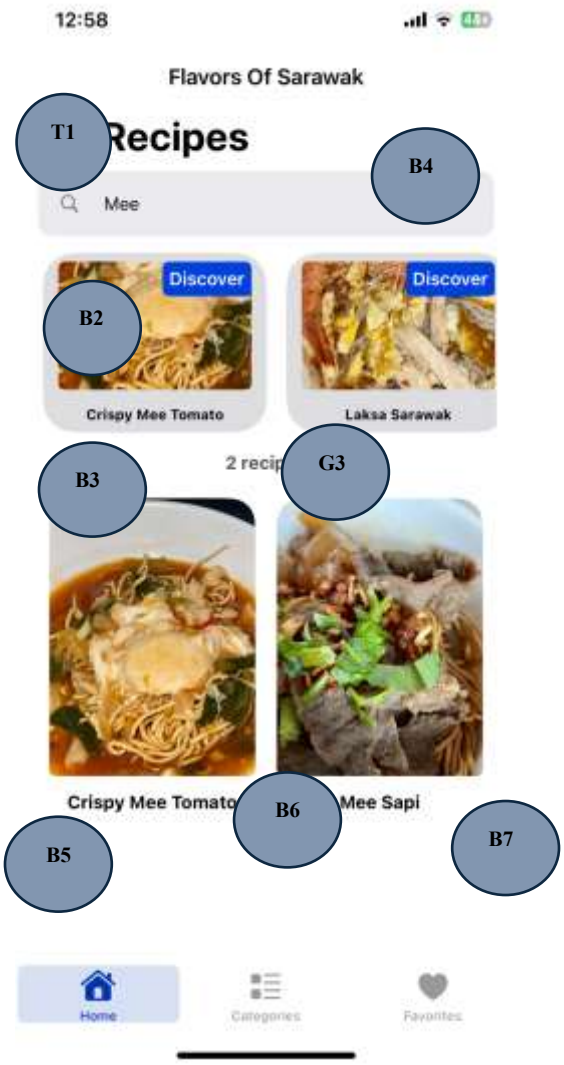
Scene 3: Search Menu

Description
When users try to search for a recipe or ingredients, a list of food recipes will appear.
Multimedia Elements
T (Text), G (Graphic), A (Animation), S (Sound), B (Button)
T1: Title **B2: Recipe List Button** **B3: Recipe Button** **B4: Search Recipes / Ingredients** **B5: Home Page Button** **B6: Categories Page Button** **B7: Favorites Page Button** **G3: Food recipe Image**

Figure 10: My Recipes

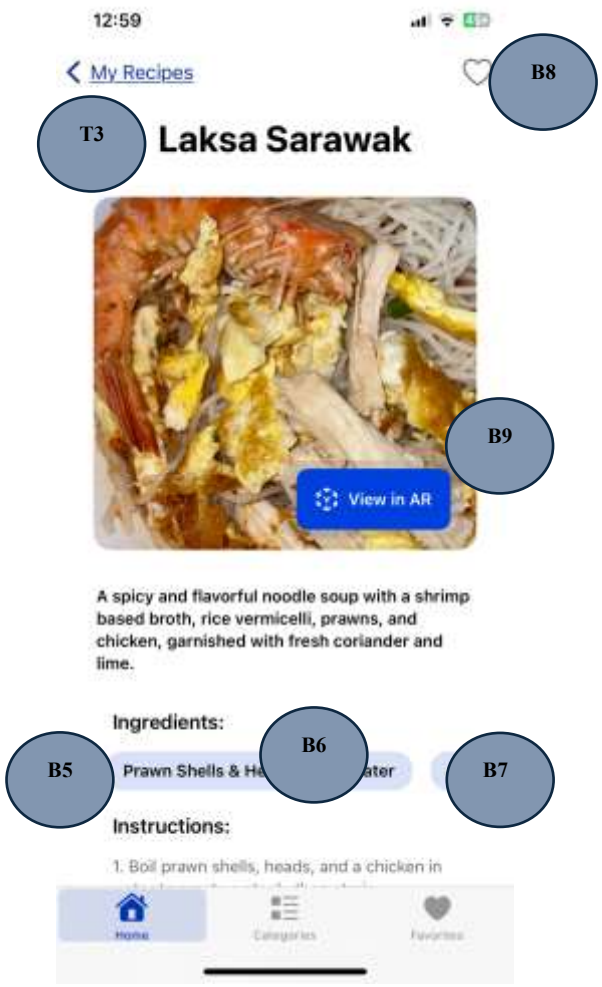
Scene 4: My Recipes

Description
For this page, it will appear once the user clicks any recipe they want. Users can click the favorite button to save the recipes on the Favorites page. Then the user can also click the "View in AR" button to go to AR mode.
Multimedia Elements
T (Text), G (Graphic), A (Animation), S (Sound), B (Button)
T3: Title **B5: Home Page Button** **B6: Categories Page Button** **B7: Favorites Page Button** **B8: Favorite Button** **B9: View AR Button**

Figure 11: AR Mode

Scene 5: AR Mode

Description
For this AR page, it will appear as soon as the user clicks the View in AR button.
Multimedia Elements
T (Text), G (Graphic), A (Animation), S (Sound), B (Button)
T4: Food Annotation Title **B10: Back Button** **G4: Recipe 3D**

Figure 12: My Categories

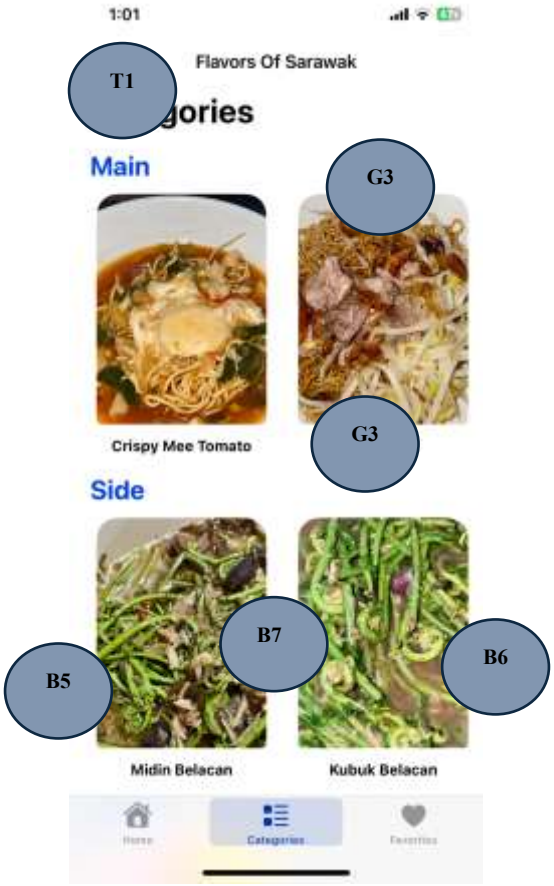
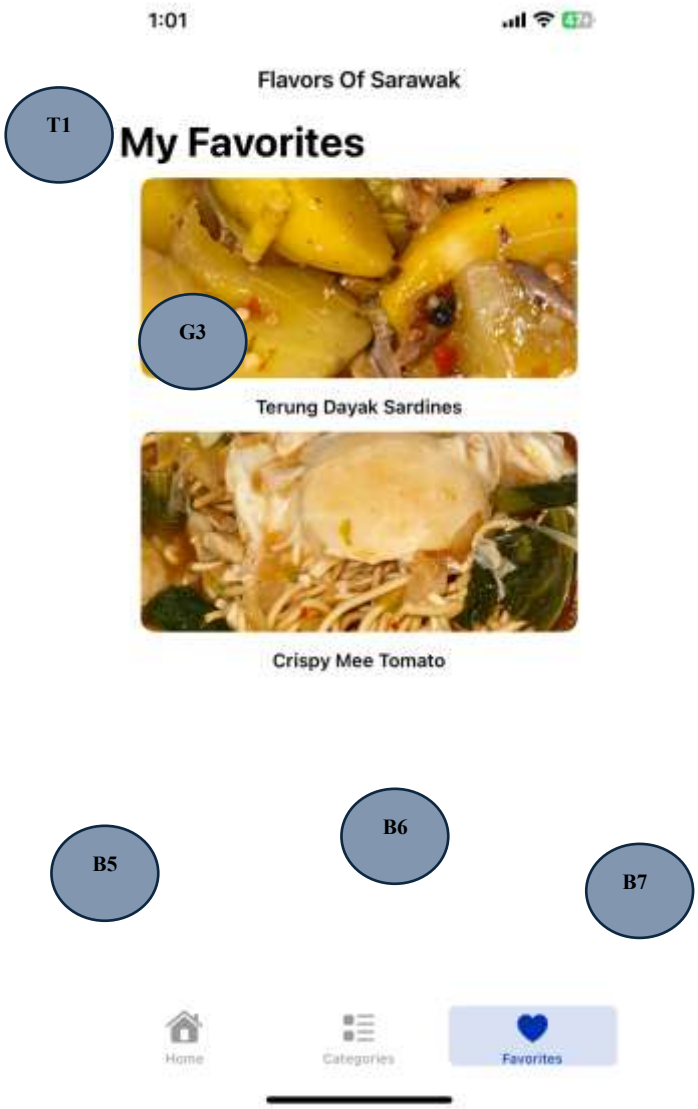
Scene 6: My Categories Page

Description
When a user clicks the Categories button, this page will appear.
Multimedia Elements
T (Text), G (Graphic), A (Animation), S (Sound), B (Button)
T1: Title B5: Home Page Button B6: Categories Page Button B7: Favorites Page Button G3: Food Recipe Image

Figure 13: My Favourites

Scene 7: My Favorite Page

Description
When a user clicks the Favorites button, this page will appear.
Multimedia Elements
T (Text), G (Graphic), A (Animation), S (Sound), B (Button)
T1: Title B5: Home Page Button B6: Categories Page Button B7: Favorites Page Button G3: Food Recipe Image

The Development Process

The development process during the project consists of several platforms. XCode, Blender, Reality Composer, and Canva were utilized in the design and development of this project. In the making of this project, some objects and stuff have been obtained from the internet and changed to create a new version. Any graphic components used in this application were created using Canva and each 3D model was created using Blender.

Usability Testing

Users will test the application to identify usability issues and gather feedback. The SUS questionnaire quantifies user satisfaction and perceptions of the application's usability, enhancing its design and functionality. This approach is to ensure the application effectively promotes Flavours of Sarawak among users.

Demographic: The evaluation's demographics reveal that the majority of the participants who test the application are female with a total of 20 (57.1%) and the rest are male with a total of 15 (42.9%). These results offer helpful information about the ages of the people studied, making it easier to understand and apply the findings of the research. Table 5.1 displays the demographic details of the participants.

Table 4: Demographic Details

		Frequency (n=36)	Percentage (%)
Gender	Male	19	52.8
	Female	17	47.2

Overall Findings: In this part, the process starts by adjusting the scores for odd-numbered questions (1, 3, 5, 7, 9) by subtracting 1. Let X represent the total score for these odd-numbered questions. Next, for even-numbered questions (2, 4, 6, 8, 10), their scores are subtracted from 5. This is calculated using the formula Y = (5 – Q2 + 5 – Q4 + 5 – Q6 + 5 – Q8 + 5 – Q10), where Y is the total score for even-numbered questions. The sum of X and Y, multiplied by 2.5, yields the final SUS score. Finally, the average SUS score is determined by finding the average of these final scores.

Table 5: Overall SUS Score

Participants	Question																Final Score
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	
P1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.0
P2	4	5	5	5	5	5	4	4	5	5	5	5	4	4	5	5	77.5
P3	4	4	5	5	5	4	4	5	5	5	5	5	5	4	5	5	82.5
P4	5	5	4	4	5	5	4	5	5	4	4	5	4	5	4	5	72.5
P5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	80.0
P6	5	5	5	5	5	5	4	5	5	5	5	4	5	5	5	5	80.0
P7	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	82.5
P8	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	4	80.0
P9	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	77.5
P10	3	3	3	3	3	3	2	3	3	3	3	3	4	4	3	3	82.5

P11	3	3	3	3	4	3	2	3	3	3	3	3	5	5	2	3	90.0
P12	4	4	5	5	5	4	3	4	4	4	4	4	5	5	3	4	77.5
P13	4	4	4	4	4	3	3	3	4	4	4	4	5	5	4	4	82.5
P14	4	5	4	5	5	3	4	4	4	5	4	4	3	3	2	4	80.0
P15	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.0
P16	3	3	3	3	3	3	3	3	3	3	3	3	4	4	3	3	80.0
P17	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.0
P18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.0
P19	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	80.0
P20	5	5	5	5	5	4	4	5	4	4	4	5	5	5	4	4	77.5
P21	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.0
P22	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	80.0
P23	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	80.0
P24	4	4	4	4	5	4	4	4	5	5	5	5	5	5	5	5	82.5
P25	5	5	3	4	4	3	4	4	4	4	4	4	4	4	3	4	77.5
P26	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4	77.5
P27	5	5	4	5	4	3	3	3	4	4	4	4	4	4	3	5	75.0
P28	5	5	4	5	5	4	4	4	4	4	4	4	4	4	4	4	80.0
P29	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	80.0
P30	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	90.0
P31	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	80.0
P32	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.0
P33	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	85.0
P34	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.0
P35	5	5	5	5	5	3	3	3	4	4	4	4	4	4	4	4	85.0
										SUS Score:							**80.4**

Discussion

The Flavours Of Sarawak mobile application has achieved a commendable average SUS score of 80.4 based on the System Usability Scale assessment. This score reflects a strong level of usability and user satisfaction. On the SUS scale, ranging from 0 to 100, a score of 80.4 indicates that users perceive the app as user-friendly, efficient, and successful. This above-average score suggests that the app's interface is well-received, interactions are effective, and overall usability meets user expectations.

Typically, a SUS score above 68 signifies an above-average user experience. With a score of 80.4, the Flavours Of Sarawak app not only meets but surpasses this threshold, indicating a successful design that fulfills usability

goals. The high SUS score carries positive implications for the app's effectiveness in promoting awareness of Sarawak's diverse flavors. The user-friendly interface contributes to sustained user engagement, making the app a promising educational tool for enhancing public knowledge and appreciation of Sarawak's culinary offerings.

Furthermore, the application's notable usability score suggests its potential to effectively engage users and convey essential information about Sarawak's flavors. A well-crafted and accessible interface is likely to contribute to enhanced user learning and retention of valuable information about Sarawak's culinary heritage.

In conclusion, the SUS score of 80.4 provides strong evidence supporting the Flavours Of Sarawak app's user-friendly nature, effectiveness, and potential as an educational tool for promoting awareness. These findings are crucial for validating the app's usability and effectiveness, contributing to the body of research endorsing interactive platforms for educational purposes. It's important to consider the study's context and limitations when interpreting results and planning further enhancements to the app's design and implementation.

5. Conclusion

In summary, the Flavours Of Sarawak iOS mobile application utilizes Augmented Reality technology to enhance Food AR experiences. This integration of Augmented Reality (AR) as a marketing communication channel within the tourism and hospitality industry will hopefully help Sarawak cuisine gain global attention and momentum to transform and enhance customer experience. Based on the user acceptance result, measured through the System Usability Scale (SUS) questionnaire, it is showing positive results. The application also tackles issues like lack of standardization in Sarawak Ethnic Cuisine. It strives to empower users by enhancing their culinary proficiency while fostering an understanding of the importance of nutritious eating habits. However, there are areas for improvement in the future. This includes addressing operating system limitations, adding more food models, and enhancing interactive features. The ongoing effort to make these improvements reflects the application's commitment to providing a better and more inclusive experience for all users.

Recommendations

The application can be enhanced in the following ways:

- Create a cross-platform application that is compatible with various operating systems such as Android, Windows, Linux, and others. Removing limitations on platform usage would expand the scope of the application, allowing a broader audience, including more young users, to fully utilize its features.
- Include additional food models, particularly showcasing Flavors Of Sarawak such as creating models for "Kek Lapis Sarawak" and other commonly served dishes. This addition would likely attract more users and pique their interest in exploring various aspects of Flavors Of Sarawak's culinary traditions.
- The application needs more interactive features as the current ones are not engaging enough, possibly leading users to feel bored while using it.

Acknowledgment: We would like to acknowledge and thank all authors and UiTM Cawangan Melaka for their assistance in producing this article.

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