Tasteonus: The Recipe Mobile Application

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***Abstract*— The mobile technology revolution significantly impacted daily human activities including cooking. The cooking trend has changed to a new concept called the "digital kitchen." It is a novel concept in cooking and illustrates the culinary process of preparing a dish while using cell phones. Unfortunately, one of the main problems caused by poor connectivity is the accessibility of the current recipe mobile application. In fact, retaining client loyalty and the absence of video instructions alongside the recipes made it difficult for any recipe app to remain competitive in this market. This recipe mobile app, Tastenous, employed JavaScript for the programming language, and Expo CLI 5.2.0, React Native 0.67, and Postman 9.14.0 for the libraries/tools. While SQLite 6.0.1 and MySQL 8.0 were chosen for database management. Windows 10, Android 12, iOS 15.3.1 for the operating system, and finally Heroku 7.59.3 for the web server. A mobile recipe software developed, Tasteonus, employs video technology to display movies alongside published recipes and to allow apps to function both online and offline. Additionally, gamification techniques are being employed to increase user engagement and preserve consumer loyalty. The offline mode and built-in video technology allow users to continue following previously saved recipes even when there is no online connection. Future improvements should concentrate on the best ways to implement the gamification notion, including adding leaderboards to the software. The apps ought to include a reward system that people can't misuse. The rewards that were promised in the application should also be available when the user redeems it.**

Keywords*— recipe app, mobile app, offline and online mode, video technology, gamification.

I. INTRODUCTION

Human activities in daily life have been significantly impacted by the mobile technology revolution. Both statistics are based on the year 2021, with 3.48 million mobile applications accessible for download in the Google Play Store and 2.22 million in the App Store for iOS users (Statista, 2022). This also applies to cooking, as most people find it more convenient to search for recipes online rather than in cookbooks.

According to research by McGarry Bowen and Kraft Foods, which was reported in an article by Cooper (2021), the cooking trend has changed to a new concept called the "digital kitchen," where 59 percent of millennials, or people in the 25–34 age range, cook while having tablets or smartphones by their side showing the culinary process of cooking a dish. As a result, the development of mobile technology has altered how individuals approach cooking. According to (Dubey, 2016), the market for recipe mobile applications should not be disregarded. For instance, Yummly, one of the most well-known recipes mobile applications, has over 10 million registered users and has raised $15 million.

Even while consumers can benefit from this type of application, it lacks some features seen in current recipe apps, like usability, user engagement, and experience. The usability and dependability of the existing recipe applications are poor since users cannot access the app if a network connection cannot be established. The majority of a recipe's components are text-based, which could be monotonous for most users, and negatively affects the user experience of these apps. Additionally, it appears that there aren't any elements that urge users to remain using these apps, which gives rivals a chance to capture their market. As a result, this project attempts to thoroughly investigate the gaps found in existing apps and provide

A. Problem Statement

The accessibility of the recipe mobile application is one of the primary issues. When a recipe app disconnects because of inadequate connectivity when the user is attempting to follow the app's directions, the outcome of the cooking was unsuccessful. In order to solve this problem, our recipe app will make it possible for apps to function both online and offline.

The majority of recipe applications also had poor user experiences because they couldn't show video instructions along with the recipes. Video technology is significantly beneficial in facilitating the cooking process. Video technology, according to research by Surgenor et al. (2017), enhanced the cooking process by providing real-time assurance of individual development. The main objective of this recipe app is to enable the display of movies alongside uploaded recipes.

Since there are numerous recipe apps, including Cookpad, Tasty, Yummly, and more, maintaining customer loyalty is crucial to stay competitive in this area. Other than using them as a cooking solution, it seems that these applications lack the right drawbacks that would encourage users to use them again. As a result, this recipe app will also concentrate on gamification techniques to increase user engagement and sustain client loyalty.

B. Research Objectives

- To offer support for both offline and online modes for the recipe mobile application in order to reduce

the disruption caused by technical issues such as network connectivity issues

- To improve user experience by activating the video upload feature when uploading a recipe to the recipe mobile application.
- To improve user engagement as well as to increase customer loyalty by the implementation of a gamification approach in recipe mobile applications.

II. LITERATURE REVIEW

The literature reviews concentrate on the current research of the study's relevant technologies, which include offline and online mode support, mobile applications, the ability to upload videos, and gamification. The in-depth comprehension of the subjects offers a comprehensive explanation of the prerequisites required to successfully construct this recipe app.

A. The offline and online mode

Support for offline and online modes in mobile applications is a concept that enables users to keep working even when there is no network connection. When the user re-connects to the network, it ought to function properly. According to Srivastava (2021), if a website or application is not created to support intermittent network connectivity, users will look for more suitable alternatives and the company would experience a loss of revenue (Ahmed et. al, 2023).

Most mobile website visitors who have poor connectivity exit the page. It emerged as the primary distinction between mobile websites and applications (Deshdeep, 2021). More advantageous than normal mobile websites like WhatsApp and Facebook is a mobile application that enables both offline and online modes. Baktha (2017) also agrees that the capability to work offline is crucial for developing a terrific app because cellular data connections are constrained based on the user's location. Despite the fact that providing an offline mode for mobile apps has benefited users and been profitable for the mobile app business, Melamed (2018) observed that the majority of app developers shunned offline app development due to its challenges.

The majority of its challenges, according to (Ferreira, 2017), are caused by offline data synchronization. To know which solution is best, the developers must be well-versed in the use cases of the apps they are about to build. Therefore, while adding offline mode support, the developer must have a thorough grasp. The goal of offline mode support would be defeated if the data offline synchronization failed, resulting in erroneous offline data being displayed to the user.

B. Video Upload Function

Users can upload videos from their local devices to be seen on a website or application using a feature called a video upload function. Lewis (2018) claims that it has been demonstrated that a well-known video-sharing website like YouTube has played a significant role in users' daily lives, particularly in the area where users typically seek guidance. 47 percent of viewers agree that they utilize online videos on YouTube as a source of advice, according to figures produced by UK viewers. The same is true for people who use online recipes and YouTube movies or clips to learn how to prepare food or perfect a cooking technique. As a result, it demonstrates the considerable influence that video technology has on users who want to prepare food. Additionally, Surgenor et al(2017) .'s study discovered that participants in cooking classes who did not have access to cooking video demonstrations lacked confidence in their ability to execute recipes properly. The other participants, however, have demonstrated gains in the technical abilities needed for cooking through cooking video demonstrations. As a result, the recipe mobile applications ought to include a feature that enables the submission of videos that show how to prepare a recipe.

C. Gamification

Gamification is the idea of implementing game components like badges, levels, and scoreboards in situations that are not game-related (Fitz-Walter, n.d.). The outcomes of this concept's widespread adoption, particularly in consumer-driven applications like eCommerce, are very favourable. The global gamification market is projected to increase and generate $19.69 billion in revenue between 2021 and 2025, according to TechNavio (2021). Al-(2020) Zyoud's research also made the suggestion that as games are known to engage users, they should be driven and emotionally immersed in them. As a result, gamification may have a favourable impact on increasing consumer loyalty to a service or product. In fact, the gamification strategy encourages users to electronically communicate their positive experiences with the application with their peers. It undoubtedly boosts the company's reputation that created the apps. Therefore, it has a strong belief that a recipe-related mobile application may produce the same beneficial outcome.

The prior research in this field focused on how the functions are used and how they affect consumer behaviour. It aided in a better understanding of the traits or features of the many recipe mobile applications available on the market, including CookPad, Yummly, and Whisk. These applications all share the same limitation, which is the lack of support for offline mode. As a result, adding an offline mode will provide the suggested recipe mobile application a competitive edge over other apps of a similar nature.

III. METHODOLOGY

A. Technical Research

The technical components available on the market were thoroughly compared and analyzed in order to understand more about them (Chow Jiunn Yang et. al, 2023). We then selected those technical components that best suited our needs for constructing the recipe apps, as indicated in Table 1.

TABLE I. TECHNICAL ELEMENTS USED FOR PROPOSED SYSTEM

Programming Language	JavaScript

IDE	Visual Studio Code 1.64.2
Libraries/Tools	Expo CLI 5.2.0 React Native 0.67 Postman 9.14.0
Database Management System	SQLite 6.0.1 MySQL 8.0
Operating System	Windows 10 Android 12 iOS 15.3.1
Web Server	Heroku 7.59.3

1) Programming language

Swift, Kotlin, and Javascript were thoroughly compared in order to select the best programming language for our recipe apps. Their relative popularity, performance, time to compile, amount of development time, and platform were taken into consideration. JavaScript was selected as the front-end and back-end programming language because it is one of the most well-liked languages and is well-known for being able to create responsive mobile applications and dynamic interactions. JavaScript's ability to handle cross-platform programming for Android and iOS lends it more weight as a preferred language. Although Kotlin and Swift have recently supported cross-platform development, a researcher had very little experience with either of them. Popular frameworks like React Native, which the developer would use to create the suggested system, are also compatible with JavaScript.

2) Libraries/Tools

A tool from the Expo CLI 5.2.0 was selected as an external tool in the context of the library and tools selected. Its capability to run the system's output on both Android and iOS emulators was suitable for this recipe app (Feroze, 2022). Once our recipe app was developed, this tool helps in publishing our apps to the Google Play Store and App Store (Expo, n.d.). The front-end and back-end development of the suggested system would be carried out using the React Native 0.67 framework. This framework was chosen because it enables cross-platform development for both Android and iOS, allowing users of both operating systems to use the generated mobile application. Additionally, it includes several tools, including Node.js, that can be used for back-end development. Despite the developer's lack of prior expertise with the framework prior to this recipe app, React Native's popularity as an open-source platform enables the developer to obtain knowledge rapidly and easily.

Another external tool, Postman 9.14.0, has also been used in testing an API. It displays the status code to show whether our developed apps were operating as planned. With this tool, we can test a back-end API without difficulty because they will get a speedier answer without needing to integrate front-end code.

3) Database management system

SQLite, MySQL, and Mongo DB were thoroughly compared in order to select the best database management system for our recipe apps. Their relative types, language support, architecture, and cost were taken into consideration. The local database for the proposed system was SQLite 6.0.1, and the remote database was MySQL 8.0. When a network connection cannot be established, these two databases can use the local database to load data to users. Additionally, if the network connection is restored, it will be able to update the data in the local database with information from the distant database.

Additionally, SQLite 6.0.1 meets the requirements of the suggested system, where both Android and iOS would be utilized to run the software, and SQLite supports both operating systems simultaneously. Because the suggested system doesn't need a lot of scalability features, MySQL is a good fit. This means that MySQL will perform queries with great efficiency, giving users speedy responses.

4) Operating system

Windows 10 was chosen as the operating system of the computer device for developing the recipe apps. Windows 10 supports the tools such as Visual Studio Code, Postman, and Expo CLI, which were deployed in developing the recipe apps. Our recipe apps are deployed on an Android operating system. This is due to its popularity rising rapidly throughout the years reaching 2.8 billion active users in 2020 (David, 2022). It is also important to note that approximately over 70% of mobile devices were running on Android worldwide (InMobi, 2021) which allows our recipe apps able to reach out to a large number of users.

Besides an Android operating system, iOS is also deployed for our recipe apps. The number of active users on iOS is huge and increasing approximately 1.8 billion active users in 2022. iOS is also highly secured which safeguards devices from malicious codes. Therefore, both Android and iOS were chosen as both of these operating systems are the most dominant among mobile users.

5) Web server

Heroku was the back-end API's web server chosen. Heroku was able to boost the recipe app’s development productivity by letting us concentrate on creating the suggested system rather than having to set up and configure a highly available server environment.

B. System Development Approach

The system development technique to be used in the creation of the recipe applications was selected as the Waterfall methodology as shown in Fig. 1. This recipe app's nature fits the waterfall methodology's comparison criteria. For instance, there is a set deadline for this recipe app, and you must work toward it. Waterfall enables the developer to work on it easily because it is simpler to grasp and utilize than other approaches.

Fig. 1. Waterfall Methodology (Sharma, 2022)

- **Requirement Gathering and Analysis:** In order to better understand the shortfalls in the current system, the requirements were gathered through a literature review. While the questionnaire was applied to get the data. The data collected was analyzed and found out the requirements and objectives for the recipe apps. It also has been reinforced and validated through this analysis process. It was found that some aspects such as such as the simplicity of design and learnability of the system should also be taken into consideration. Therefore, the developer believes that the data collection was done successfully. Before moving on to the next stage, a list of all the objectives and deliverables for the suggested recipe apps was created.
- **System Design:** The criteria were carefully examined before the recipe app design was created. Before moving on to the next stage, a list of the hardware and tools needed for creating the apps was made.
- **Implementation:** The first step in putting the apps into use is to refer to the wireframe that was generated and use the hardware and tools mentioned in the previous stage. The system was created in little programs or units, and testing was done on each one to make sure it was error-free before moving on to the next stage.
- **Integration and Testing:** To test if the system will continue to function after the integration, all of the units from the previous phase will be included in this step. Integration Testing could be completed after system debugging and necessary corrections. User feedback was obtained after users had an opportunity to utilize the apps in order to carry out the User Acceptance Testing.
- **Deployment:** The developer would deploy the suggested system to the actual environment during this phase.
- **Maintenance:** If faults are found, the feedback provided by the actual user and address the problem will be revised. The system's changes are available as patches and release a new version of the system with improvements to the system as well, all to boost user happiness.

IV. RESULT

A recipe mobile app called Tasteonus is accessible on both the Android and iOS operating systems. Fig. 2 shows Tastenous functionalities which are managed account, recipe, feedback, and reward. While Fig. 3 shows standard actions available at the manage account function such as registering, logging in and logging out of the system, and updating profiles. This recipe application can still be used by users to search and retrieve the recipes that they stored when using it online, even while it is in offline mode. Through Tasteonus, users are also able to organize and share their recipes as shown in Fig. 3 at 2.0 Manage Recipe data flow.

In addition, users are also able to offer a video tutorial on how to make the dish while uploading or amending a recipe. With that, consumers wouldn't have to search for those movies outside and would instead acquire more insight into how to correctly prepare the dish by watching the video demonstrations. When users share recipes and offer feedback, Tasteonus will reward them with points, as shown in Fig. 3 at 3.0 Manage Feedback. Indeed, as shown in Fig. 1, 4.0 Manage Reward, these points could subsequently be redeemed for premium benefits on Tasteonus like cashback reload pins and e-Vouchers. This feature encourages users to continue using the application, improving user engagement, customer loyalty, and Tasteonus brand value.

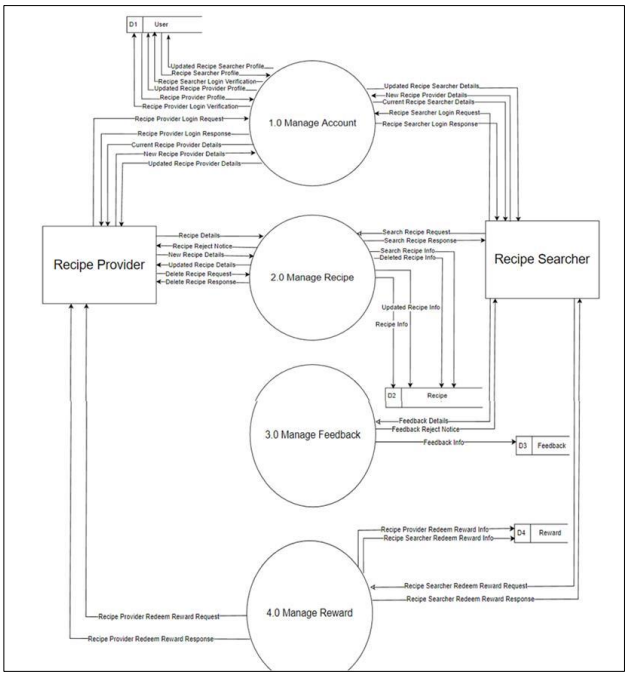

Fig. 2. Level 0 Data Flow Diagram of Tasteonus

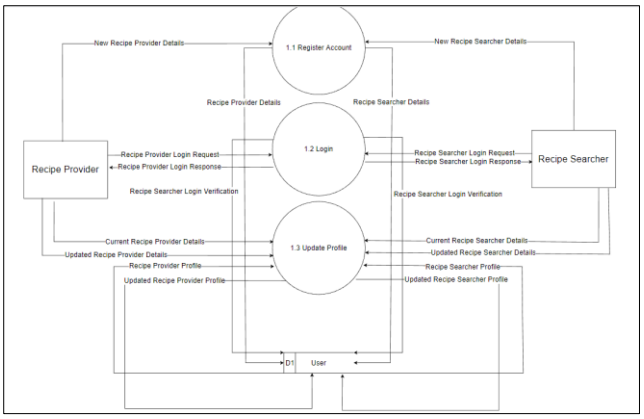

Fig. 3. Level 1 Data Flow Diagram of Tasteonus (Manage Account)

V. CONCLUSION

The mobile recipe app Tasteonus has been built successfully. With the incorporated offline mode, users can continue following previously saved recipes even without an online connection. Based on the User Acceptance Testing, it was one of the most well-liked capabilities. In fact, users don't even need to access video streaming websites to continue using the application to watch video recipes while they're cooking.

Despite of well-function for both offline mode and video technology, Tasteonus has several constraints. For instance, testers for the User Acceptance Testing have mentioned how their user experience has been impacted by the application's lack of a support desk. For the first time, they do not fully comprehend how to utilize the application correctly. Additionally, the program interface is unattractive and plain. It influences user happiness, which may have an impact on how well the program retains users. As a result, by applying some sound guidelines found in the actual world, future improvements might concentrate on improving the user interface. A user guide ought to be included with the apps. It must be available through the app so that customers may examine it and gain more understanding of how to utilize the app effectively. Future academics ought to undertake further research on the optimal methods for applying the gamification concept, such as incorporating leaderboards into the program. In fact, the apps should provide a reward system that users cannot abuse. When the user redeems it, it should also be able to give out the incentives that were promised in the application.

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