Food and Beverage Recipe Generation System

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Abstract— **Meals preparation activity at home has been facing a downtrend over the globe as the growth of technology emerges. Dining out and the popular delivery take-outs are two of the main factors in causing the downtrend to happen. Research have shown that people is influenced easily by advertisement in the mobile devices, thus providing an opportunity for the developer to target the users who are interested in meals preparation but are lacking in time. This study focuses on the identification of the problems faced by most of the adults in the modern society that can be resolved with the introduction of digital product such as mobile application. Hence, this study has been initiated to revolutionize the idea.**

Keywords— Food, Beverage, mobile, meal, health and diet.

I. INTRODUCTION

In the current world of globalization, the rapid growth of technology has brought about various benefits to all the users along the world, especially in the industry of food and beverage for its increasing convenience and time efficiency. People who lives around the age of technology has becoming more and more dependent on the quality of convenience and time efficient, thus they would usually opted for ordering a takeout or eating outside instead of making their own food and beverage for daily consumption due to its hassle of making their own meal. Even if the people who intends to prepare their own meal, it requires a great experience and culinary skills to produce the result of the delicious meal they get at the outside. Besides the issue of lacking in meal preparation skills and deciding what type of meal to be prepare can also be an issue to the people. The reason for this is that some people generally have the dilemma in the selection of options, which in turns creates another issue for them such as stress and anxiety feelings. The impact of this trend leads to people losing the ability to make their own scrumptious meal due to the steep learning process to prepare a dish or even to think what dish to make for a meal. The idea of the Food and Beverage Recipe Generation System is proposed in order to tackle all of the issues faced by the people in these days.

One of the prominent issue faced by the current generation of people is the incapability of delivering the most accurate recipes and their sources to the readers due to the passing of time. Some of the recipes in the cookbooks are found from manuscripts which extends back to as far as the 1800s. Thence, the details of the recipe may not be as accurate as possible, and it may have undergone different enhancement or deterioration along the time. [1] In the case where some recipes are prepared incompletely, the results produced would be significantly different from what it is expected based on the cook book. Thence, the consequences of it would not only further decreasing the readers' confidence in food and beverages preparation, but as well as increasing their reliance on take-outs or eating outside for their future daily meal consumptions [2].

Besides, another main issue face by the people during the process of preparing their meals is the lack of culinary knowledge. It is found that at least forty-five percent of the current generation of adults does not have the confidence in their own cooking skills. [3] With this in mind, it is clear that most of the current generation of adult does not possess the art of culinary, where it could possible help them to live a better and healthy lifestyle. As a result, the side effects of eating out daily are shown through various statistics that have caused diabetes, hypertension, obesity, heart diseases and so forth. [4] All of the side effect would ultimately jeopardize their health, who are not only lacking in time for eating healthy, but also lacking in time to keeping the body active through exercises.

Furthermore, another issue faced is the selection of meal to prepare that fulfils different needs. Very often, it is common to see people selecting the type of meal they would like to consume based on their desires, which sometimes it is unhealthy to them, thus making it harder for them to make a decision to select the most balanced meal in terms of satisfaction and healthiness of the meal. [5] In addition, the ingredients available in the living area of the adult also has a high influence in determining the type of meal to be prepared. The reason for this is that people tend to prefer to work around based on the things that are already establish, in this case (owned), to avoid spending more time on things they prioritize less. [6] Also, ingredients can be used differently for different categories of meals thus making adults to get the dilemma in the selection of the type of meal to be prepared. This is because the difference of categories of meals may provide more in satisfaction or more in the healthiness of the body.

As per the issues that have been mentioned above, a Food and Beverage Recipe Generation System is proposed in order to help the current generation of adults to help in deciding their daily consumption habits as well as helping them to keep the meal preparation as time-efficient and as convenient as possible.

First and foremost, the issue of the cookbook information are not up-to-date has also heavily affects the deliverance of a good meal preparation. As the traditional cookbook provides text information and illustrations from the moment the cookbook is manufactured, the information provided may not be up-to-date as some of the ingredients can now be easily replaced by some newer, and more functioning products. Besides, the steps to prepare the meal are also ever-changing, thus making traditional cookbooks obsolete overtime. For instance, the cooking utensils such as whisk is now easily replaced by mixing machine. As such, the steps to prepare the recipe may be different and inaccurate. With this in mind, the usage of digital system to act as a cookbook recipe storage are much more reliable as compared to the traditional cookbooks. This is because the administrator of the system are allowed to update the recipe whenever it is necessary.

Moreover, the lack of culinary knowledge that deters the adults away from trying to prepare and cooking a meal can also be resolved with the usage of the system application. This respective system application shows the users the ingredients and steps to prepare the recipe. This will allow user who are lacking in the culinary knowledge to benefit from it thus making the meal preparation easier. Besides, the mobile system application also helps in providing convenience to its users as its physical size are depending on the users' devices. This allows the mobile application system to be allocated to different places easily, meaning no physical limitations is set to the system. This would solve the limitation of the traditional cookbook where it is necessary to bring it to everywhere in order to acquire the information from it. For instance, when shopping for the ingredients for a respective recipe, the mobile application system will prove to provide much more user experience satisfaction. As such, the proposed mobile application system is aimed to resolve the technical limitations of the traditional cookbook and enhances the convenience characteristic as much as possible.

Not only so, the issue with the dilemma of selecting a recipe to prepare can also be resolve with the mobile application system. This particular system would include a feature that would also users to search for food and beverage recipes suitable for them based on the ingredients that they have at the moment. Users are to input certain types of ingredients into the mobile application and then the system would come up with different ways to cook the specific ingredient. The reason for this is to aid the users in reducing their time to decide on which recipe to cook, but based on what ingredients that they have in their home. This helps users in avoiding the hassle of going to the supermarket just to get another ingredient for a recipe.

II. LITERATURE REVIEW

Studies have shown that the food and beverage recipe recommender system are capable of bringing about various benefits to the daily lives of people. One of the benefits is that it helps to identify the food that the people they want to consume for a meal that also in turns recommend healthy foods as much as possible to ensure that the users are nourished in health. [7] The advantage of this system offers not only the capability of assisting in the user's decision making process, overcoming information overloading problem as well as helping to change the user behaviour. [8] This is because of the system's design is integrated along with the utilization of technology to acquire the greatest possible outcome for its users. The achievement of success of this project depends heavily on the optimal features develop to help in improving the lifestyles of the people through the management of their eating habits [9].

In this generation, people have been seemingly to adapt a lifestyle of takeout and eating out for their daily consumption habits. This habit have both its advantages and disadvantages but however, the latter wins over the former. This shows it is a bad sign for the people because one of the core disadvantage the underlying health issue that comes along after continuously performing the same routine for a long period. [10] Thence, it is believed that people's daily consumption habits should be altered to prepare their own meals instead in order to avoid these side effects of eating out and takeout.

In the current society, cases of adults who are poorly nourished in terms of meals as well as not having fixed routine for meals contributes to the deteriorating health of the adults in the working phase. As per Jennifer and Melissa have mentioned in their journal, adults who are works in the society are often a victim of having poor meal quality and meal routines. [11] The lengthy working hours have certainly affected the adults' health in a harmful way yet it is not realized by them. [12] Poor meal routines are often related to two main factors that affects the quality of the meal routine, which is the meal regularity, whether the adult consume in regular hours and meal preparation, whether the adult prepare their own meals. [13] The adults who have ventured into the society long enough to know the downsides of having poor quality meals and irregular meals, are still not paying a proper attention to this respective issue. These respective issues have shown that the time is one of the crucial factor in leading the adults to live a healthy and productive lifestyle. As such, they tend to prefer activities or hobbies that allow them to have as much time-efficient as possible in order to suite to their busy lifestyles.

In this case of discussion, the trend to search for a food or beverage recipe will be discussed. For the recent cases, adults nowadays tend to be looking for recipes that are easier to prepare and cook, in order to fit the cooking hobby into their tight schedule. Some of the notable recipes that are currently trending is the one-pot dinners, sheet pan meals, and two-ingredient recipes. This type of recipes not only helps in saving the time of the adults, but also helps to provide a creative and innovative way to cook the meal. On other cases, older adults tend to face issues with the nutritional challenges intake in their daily consumption habits. The factors that lead to this issue happening ranges from the living situation, socioeconomic status, accessibility to food-related services and so forth. [14] When the older adults' daily consumption intakes are lacking in nutrition value, it is most likely to lead to the happening of various chronic diseases. However, this respective issue can be solved easily with the proper planning of their meal nutrition value as well as having a good knowledge in it.

The growing of technology devices such as smartphones has paved the way for the popularity of the mobile application usage among the young and older adults. As the smartphone devices is slowly replacing the television and radios as the main entertainment outlet, the importance of it grows accordingly as well. Statistic have shown that in 2018, the global mobile application market size was valued at $106.27 billion, and will be projected to reach $407.31 billion by 2026.

[15] With mobile application all over the Internet nowadays, communication between its users are now much more convenient and cost-effective, as compared to the previous era where phones can only perform simple tasks such as calling and messaging only.

A cooking recipe recommendation system with visual recognition of food ingredients was proposed by [16] in order to assist its users in deciding the meal recipe to prepare while in kitchen or in the grocery. This particular system runs as an Android-based mobile application on the mobile device and uses the mobile phone's camera to proceed with the visual recognition of food ingredients function. This respective system has already integrated 30 different kinds of food ingredients into the system's database for experiments and have acquire the result of 83.93% recognition rate of the food ingredients. With the design of this particular system, it allows the users to acquire food recipes with maximum efficiency.

On the other hand, Sara Jenkins' New Italian Pantry system has been introduced into the market by Chef Sara Jenkins and Nick Fauchald. [17] This particular system focuses on modelling the system into an interactive cookbook that turns the food ingredients into simple and approachable dishes. The users of the system are to choose their ingredients firstly, then mix it along with other food ingredients in order to acquire a good recipe of dishes. To explain further, this particular system features the complex combination system that many of the users would prefer. The generation of recipes from this application solely based on the recipe that are already uploaded in the database, thus users is not allowed to upload their own recipes into the system. As such, this system is more of a digitalized traditional cookbook from the Chef itself. After the comparisons between the proposed system and both the similar systems that are already available in the market, it is found that there are various areas that the proposed system can be improved, even though their generally are of the same category of mobile application, online mobile application recipe cookbook. The proposed system, are lacking in features that can be introduced as a unique system into the market. The lacking of innovative and creative features makes the proposed system not as presentable and may require effort into improving the system. Thence, the comparisons between the similar systems with the proposed system has given the developer more insights in improving the proposed system.

To summarize this literature review, information technology has evolved until a stage where most available industries have been demanding on its implementation. In this Investigation Report, the food and beverage industry was studied in order to acquire a detail look on how the technology can be utilize to improve the daily consumption habits of the people. With the help of the technology, the daily consumption habits can be enhanced greatly in terms of experience as well as satisfaction by providing food and beverage recipes that fulfils the needs and expectations of the users. The system also solves various issues of the people such as assisting in the user's decision making process, overcoming information overloading problem as well as helping to change the user behavior [8].

III. METHODOLOGY

The first system development methodology recommended for this project would be the Waterfall Model. The Waterfall Model emphasizes on the logical progression of steps to be

taken throughout the software development life cycle (SDLC). [18] The actual implementation of the waterfall model is rather straightforward, where there are six specific stages of the waterfall model and each of the phases is to be completed before proceeding to the next phase and there will be no overlapping in between phases. The six specific stages are known as Requirements Analysis, Design, Implementation, Testing, Deployment and Maintenance. Each of the specific stages mentioned above are arranged in a proper sequence and it limits the direction flow of the SDLC to only move in one direction. This means that any changes in the SDLC would have to wait until the end of this SDLC first before making modifications.
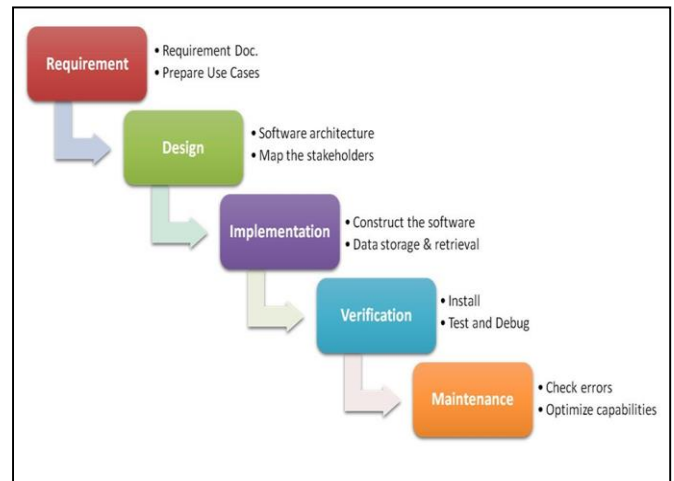

Fig. 1. Overview of the waterfall method

The advantage of using this methodology is that the development steps are in the linear-sequential life cycle and has strict controls to ensure the documentation and design reviews are done adequately as to ensure the quality, maintainability and reliability of the end product. [19] The Waterfall Model are also preferred when the deadlines are clearly defined at the start of the project as it helps in the definition of each specific tasks to be perform and the time can be allocated to it. In simple words, any of the project that utilize the Waterfall Model are ensured with a quality deliverance of the product. The second recommended system development methodology is the Scrum Methodology. Scrum is a type of Agile Methodology that promotes the practice of continuous iteration of developments and testing in the SDLC process in order to facilitate potential changes along the SDLC cycle.
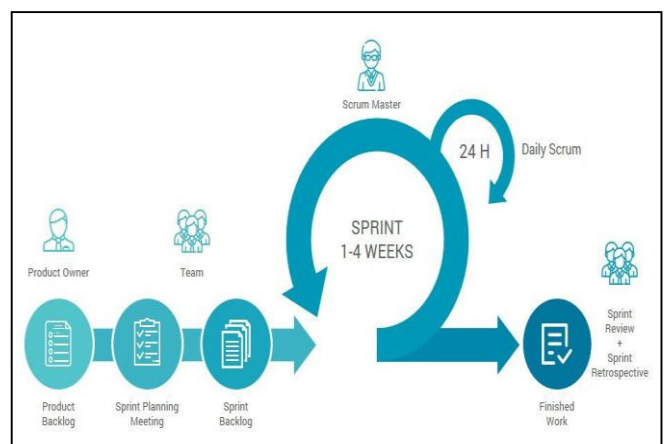

Fig. 2. Overview of Scrum Methodology

In Scrum, having a leader to lead the SDLC is not much of its importance as Scrum helps in fostering self-organizing among the functional team members. Each of them highly understood the requirements and needs to be fulfil in the project and follows on performing and completing their own tasks on hand. If any upcoming changes such as requirement changes arises, it allows the team to accurately pinpoint the related tasks to the particular team member without affecting the whole team.

This makes the Scrum Methodology much more flexible as compared to the Waterfall Model. Besides that, Scrum Methodology also helps in shortening the time taken to market the product and eventually resulting in a higher revenue due to its deliverable of the development phase represented as a new release of the product. This is because Scrum Methodology implements the Sprint Cycle that lasts usually from 2 weeks to 4 weeks. The Sprint Cycle focuses on breaking down complicated tasks into a simpler task and it is selectively handled by suitable team members. In this period of Sprint Cycle, all different components of the software are coded, tested and integrated together as a new system to make sure the system is fully functional.

Both of these software development methodology have their own unique advantages and it can be used in different types of scenarios. For the case of this project, Waterfall Model is chosen as the System Development Methodology due to its project planning characteristics that allows the developer to ahead of the system development process and minimizing any potential risk as soon as possible. The Waterfall Model helps the developer to focus on one phase at each time and ensure the deliverance of quality system.

IV.   REQUIREMENT VALIDATION

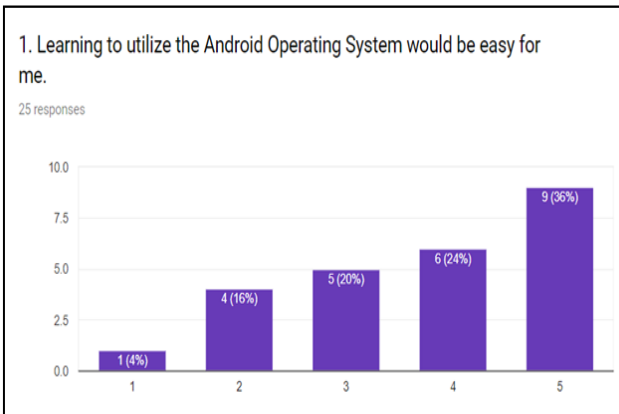### A. *Sample analysis of data collected through questionnaire*

Fig. 3.   Question 1

This question helps in collecting information about how well the respondents are capable of utilizing an Android Operating System smartphone. From the data collected above, majority of the respondents which is 60% of the respondents are confident that they are highly capable of utilizing the Android OS. Only a small margin of the respondents strongly disagree that they are capable of using Android OS smartphones.

This question is asked to confirm whether the respondent are familiar with the operations of an Android Operating System smartphones. The second question helps in collecting information about how well the respondents are capable of understanding the functionality and purpose of the Android mobile application. From the data collected, majority portion of the respondents of 68% agrees that they do know the purpose of any Android mobile application but 24% disagrees that they do. This question is asked to confirm whether the respondents are capable of using any Android mobile application with ease.
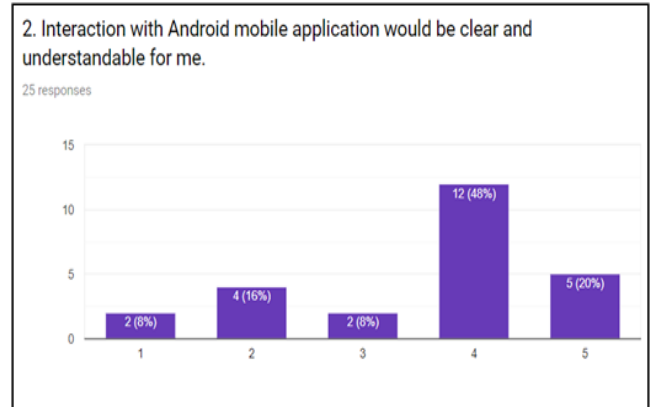

Fig. 4.   Question 2

The third question helps in collecting data about how familiar the respondents are with any technology gadgets, which includes smartphones, mobile watches, computers and so forth. From the data collected above, majority part of the respondents of 68% says that they are quite familiar with any technology gadgets while 24% disagrees so. The question is asked in order to identify whether the respondents will incorporate this system in their daily lives.
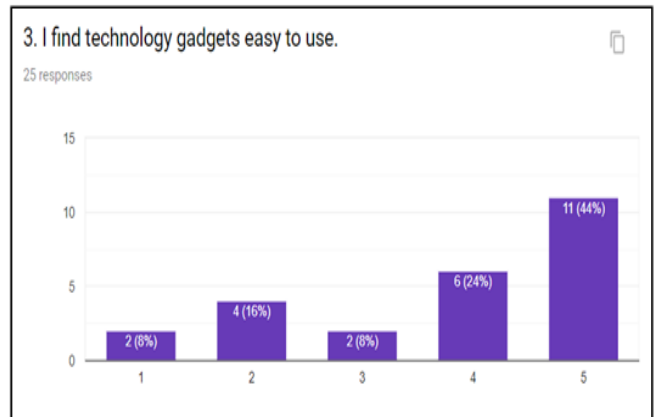

Fig. 5.   Question 3

V.   IMPLEMENTATION

The figure 6 shows the first starting screen of the Food and Beverage Recipe Generation System, where it is a Login screen. In this screen, it consists of two EditText field that allows its users to input value into the text field. Also, the Login screen also has 2 buttons, which is the Login and Register button.
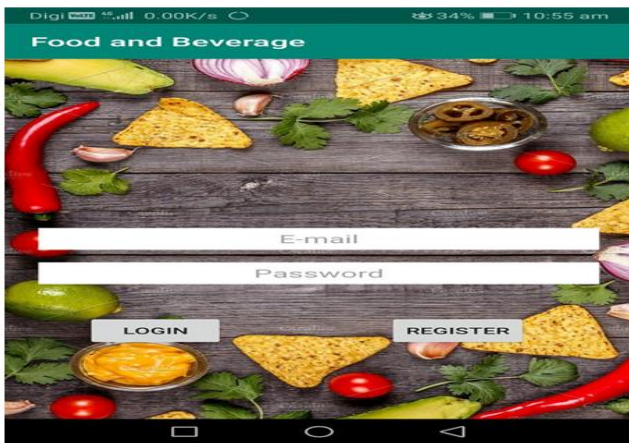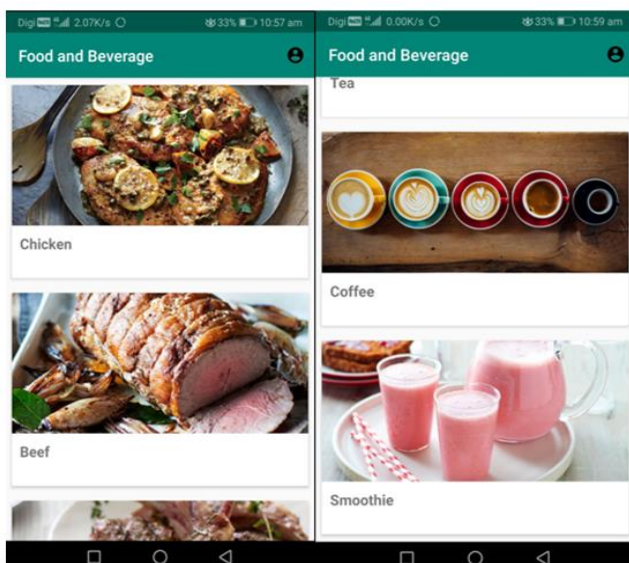
Fig. 6.   Starting screen, Login Screen

Fig. 7.   Main Screen

VI.   CONCLUSION

Throughout the development process of the Food and Beverage Recipe Generation System, it has certainly given the developer a lot of experiences that the previous studies have not been able to. The reason for this is due to the responsibility in delivering the system all depending on the individual's work, effort and desire to succeed in the production of a high quality system. Until the end of this project, this project has given the developer a lot of insights that could certainly help them to soar to a higher skies in the future. The developer has successfully delivered the system as per the deliverables mentioned at the start of the project, as well as incorporating some of the special features into the system that makes it much more presentable in the market. However, although the project was completed successfully, it still certainly have more room for improvement that can be made to the mobile application in order to enhance its features and functionality. In terms of the investigation performed during the whole project process, it is certainly not adequate as the world is vast and beyond that, the developer are certainly still too young to be dreaming to achieve what they want to achieve without more striving power. Nonetheless, the process of performing investigation and research on the relevant topics has certainly brought about a better understanding on this project's area as well. It has

certainly helped the developer in growing into a better person as well as reinforcing the skill-sets needed as a developer. To discuss on the matter of the gaps in the research and design, it is hard to say that there is no gap between the research performed by the developer and the final design of it. Experiences plays a crucial role in influencing the decisions made, which it could have been better. Withal, the time continues to flow and there is certainly no time for you to turn around and look back.

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