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MealCompass: A Food Recommendation System with Machine Learning

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ABSTRACT

Post-pandemic, Malaysians face “choice overload” when eating out. Additionally, the rising incidence of diabetes and obesity in Malaysia emphasizes the need for healthier eating options. To address these problems, MealCompass recommends food to users based on different user-defined criteria. Moreover, it aims to enable users to find healthier options and allow restaurant owners to provide nutritional information on food items served, which studies have proved an increase in selection of healthier choices by 13.5%. A hybrid recommendation system is proven to be more effective compared to using traditional methods alone. The hybrid recommendation system is trained on Google Colaboratory, and recommendations are shown in the application through a Flask server and Retrofit client. Waterfall model is used throughout the whole project. User feedback such as cuisine preferences, diet preferences and allergy issues, as well as the ratings of recommendations from users of the application will continuously refine and enhance the recommendations, ensuring more personalized suggestions over time. User acceptance testing among 16 respondents showed satisfaction and capability to deliver accurate and diverse recommendations. Despite these successes, limitations are noted, laying the groundwork for future enhancements, such as deploying the recommendation system to the cloud.

Keywords: Food, Healthy Diet, Machine Learning, Nutritional Information, Recommendation System, Restaurant

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INTRODUCTION

A few years after the pandemic, the COVID-19 virus has been moderately controlled, lockdowns have also been lifted. More households and individuals are eating out. According to the research done by (Pfordten, 2023), the average Malaysian household spent 2.4% more in restaurant and accommodation services between 2019 and 2022. In view of the growing phenomenon of eating-out, restaurant businesses have been booming. Customers have an abundance of dining choices to choose from. Factors such as price, food quality, variety, reputation, promotions, location and information sources play pivotal roles in driving a customer's restaurant choice. (Chua et al., 2020) While significant at first, having too many choices to choose from could also lead to a phenomenon known as "choice overload", where people have trouble in making decisions. People tend to feel freer when more options are presented, even if those options end up being distressing at decision time. (Reutskaja et al., 2018)

On the other hand, the past few decades have seen an increase in fast-food consumption. 32.7% of the people living in rural areas consume fast food once a month, while 25% of the people living in the urban area consume fast food more than four times each month. Only about 5% of the Malaysian population eats the recommended serving of fruits and vegetables daily. (Y'ng & Ming, 2023) Having healthy eating habits is necessary to prevent the risk of chronic diseases such as diabetes and obesity. Moreover, consuming fast food lowers the levels of brain-derived neurotrophic factors, which are detrimental to brain health. (Zainuddin et al., 2023) According to the research (Akhtar et al., 2022), the presence of diabetes in Malaysia had a 68.3% increase from 2011 to 2019. It is expected to affect more than 7 million adults by 2025. Similarly, studies from (World Obesity Federation, 2023) show that almost 41% of Malaysian adults will be obese by 2035. The alarming trends of these diseases could be due to the low awareness of healthy eating habits among various populations and physical inactivity among the ageing populations. (Akhtar et al., 2022) Despite health concerns, university students continue to choose fast food due to the convenience and price. (Tunde et al., 2023) Additionally, unhealthy eating habits could also come from the side effects of the long-term lockdown and lifestyle changes during the pandemic that caused stress eating and anxiety among the population. (Pitol & Sapir, 2023)

A study done by (Shangguan et al., 2019) shows that adding food labels or nutritional information on food products, reduces consumer intake of calories by 6.6%, fat by 10.6% and increases vegetable consumption by 13.5%. This can improve the eating behaviour of consumers and motivate consumers to think twice before choosing unhealthy food products. Research has shown that the buying decisions are often done in a short period, without an extensive survey of a product. Therefore, the addition of warning labels on food products can catch the consumer's attention and can modify the decision before purchasing. (Ares et al., 2023) Restaurant owners can contribute to this by adding nutritional labels on each item on the menu, promoting menu transparency. (Chan et al., 2020) By doing so, consumers may opt for better and healthier choices.

With these challenges, it is important to address the dining choices through an application that recommends food based on each customer's health profile and preference and shows the nutritional information of each menu item in the restaurant. Additionally, an application that allows users to view recent dining establishments and offers information to increase awareness on healthy eating habits is essential for having a healthy diet.

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LITERATURE REVIEW

Related Works

Numerous studies have shown the superiority of hybrid recommendation systems. (Chavan, Thoms, & Isaacs, 2021) proposed a food recommendation system that uses a hybrid of collaborative filtering and content-based filtering to complement each technique's limitations. The dataset used was from AllRecipes containing more than 600,000 recipes. After conducting tests, the hybrid recommendation system showed the best results in terms of accuracy, recall and precision. Hybrid models typically outperform traditional approaches in terms of recall and accuracy because these models combine content analysis, item deconstruction, and group behavior dynamics.

(Nouh et al., 2019) proposed a smart recommender based on hybrid learning models. The dataset used was on 232 items from the USDA Branded Foods Database. This study found that the accuracy of the hybrid method is 14.61% higher than traditional methods.

(Amanuel Melese, 2021) also proposed a hybrid food and restaurant recommendation system that combines the content-based and collaborative filtering techniques together. The content-based filtering technique uses TF/IDF to filter out food and restaurant keywords for specific users, whereas collaborative filtering will calculate the similarity of users. The dataset used was from the U.C.I. repository and the U.S. government's open data. The first dataset contains information about users, restaurants and food. The second dataset contains information about food items with 329,824 entries. For evaluation, different algorithms were used, and the Random Forest algorithm performed the best on the hybrid recommender system.

(Afoudi, Lazaar & Al Achhab, 2021) introduced a hybrid movie recommendation system that combines content-based filtering and collaborative filtering together with deep learning. The Movielens 100k dataset was used. After evaluating, it can be seen that the F-measure score of the hybrid system is higher than that of both traditional content-based filtering and collaborative filtering methods.

(C. Channarong et al., 2022) proposed a hybrid recommendation system based on the bidirectional-encoder-representations-from-transformers (BERT) technique which uses the content-based filtering approach. The proposed method aims to apply both content-based filtering and collaborative filtering. The datasets used were the Movielens 1M dataset, Yelp dataset and Goodreads dataset to test the accuracy. For evaluation, the hit ratio method which measures the accuracy of the top-K recommendations list for each user was used. After testing, the proposed hybrid method performed better on average than the traditional BERT method.

(Fu & Ma, 2021) proposed a hybrid approach to the online marketing recommendation system by combining content-based filtering and collaborative filtering approaches together. The dataset used for this experiment was from the Movielens website. 11560 scores of 1682 movies from 100 users were split into 90% for training data and the remaining for testing data. The evaluation metrics used were precision and recall. The results showed that the precision and recall values of the hybrid approach are higher than the traditional collaborative filtering method on its own.

Lastly (Tewari, 2020) researched generating items recommendations by combining content and user-item based collaborative filtering. This hybrid approach was tested with a dataset of 8012 ratings from 517 users on 596 movies. To test the effectiveness

of the proposed approach, the precision value was used. The precision value of the hybrid recommendation approach showed a significant improvement of 21% over the traditional approaches like user-based collaborative filtering and matrix factorization approach.

Review of Existing Applications

Table 1. Comparison Between Existing Applications and Proposed System

Features	**OpenTable**	**Yelp**	**Restaurant Guru**	**Proposed System**
Personalized recommendations	None	None. Keywords of meal preferences will show up in search results.	None	**Yes. Based on user input and recommendation rating.**
Restaurant information	• Basic restaurant details • Ratings and reviews • Menu (only for selected restaurants)	• Basic restaurant details • Verified rating and reviews. • Menu (outdated and available only for selected restaurants)	• Basic restaurant details • Keywords of user reviews • No menu	• **Detailed restaurant details** • **Ratings** • **Detailed menu with images, price and allergens**
Food preferences	No	Dietary and food cuisine preferences	No	**Dietary and food cuisine preferences**
UI Design	Simple with nice animations	Might be too complicated	Outdated and inaccurate	**Simple, easy-to-use**
Connect with restaurants	Book and call directly	Call restaurant	Call restaurant	**Call restaurant/connect with admin**
Add business	Available in a separate paid application	Allowed to claim a restaurant's business with a business account	None	**Restaurant owners allowed to register new restaurant or claim existing restaurant**

The table above shows the comparison between existing applications on the market together with the proposed system. After thorough search, it was found that hardly any applications recommended food and restaurants based on user preferences and health. Most applications were primarily for restaurant reservations and recommended restaurants for users based on location.

OpenTable stands out for its easy-to-use interface and smooth booking experience, allowing users to book or connect directly with restaurants within the app. However, its limitation lies in fewer restaurant options in areas where it is not widely used, and its

menus could be further improved with detailed calorie counts and nutritional information. Yelp, known for its global availability, enables users to select food preferences and diet choices for better recommendations. Despite this, Yelp mainly features older, well-known restaurants and offers less detailed information compared to OpenTable. The many unrelated features of Yelp might confuse users who only want restaurant recommendations. Additionally, Yelp also allows business accounts to claim businesses. Restaurant Guru collects user reviews from various platforms and allows users to search for specific dishes at restaurants. While its unique dish search feature and review summaries are useful, it suffers from an outdated interface and concerns about the reliability of the information shown in-app.

Finally, after comparing the existing applications on the market, it can be concluded that some features are to be included in the proposed system other than recommending food based on user preferences and health to further enhance the user experience of the proposed system.

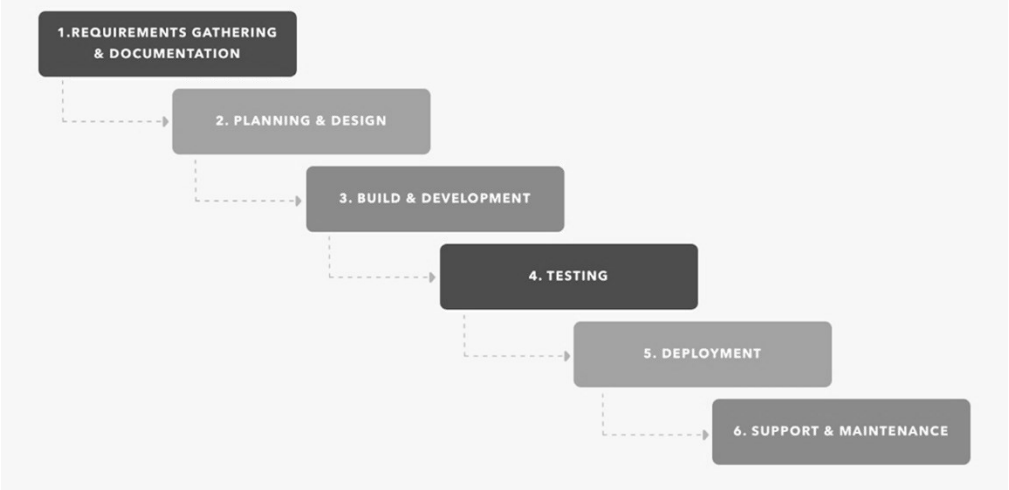
RESEARCH METHOD

Project Methodology

SDLC models are crucial in software development to make sure that a project can achieve completion and accomplish all its scope and goals while adhering to professional standards. The SDLC model selected for MealCompass is the waterfall model.

Resembling a waterfall, each phase in the model flows down consecutively one after another. (Atlassian, 2023) It is straightforward and easy to use. Additionally, the waterfall model provides a clear structure of each phase, and the goals of the system can be determined early. Each phase in the waterfall model does not overlap with each other, ensuring all tasks in a phase have to be completed before proceeding to the next. The waterfall model was chosen because this system is relatively small in scale, with clear objectives and goals already discussed early in the requirements gathering phase. Selecting the waterfall model is also cost-effective and is in line with the system's requirements.

Figure 1. Waterfall Methodology (Senarath, Udesh S, 2021)



As shown in Figure 1, the waterfall model follows a linear sequential life cycle and has six phases. (Togas et al., 2021) There is no overlapping of each phase. The breakdown and details of each phase are discussed below.

1. **Requirements Gathering**

The first phase involves collecting requirements for the development of the proposed system. This begins with identifying the current problem and constructing executable objectives for the system. Additionally, the project scope and research questions were also documented to build a foundation for the system.

An in-depth literature review was done to understand and evaluate what has been done and what can be further improved in recommendations. The literature review of related works resulted in implementing a hybrid recommendation system for this system. Lastly, a review of existing applications on the market was performed to further identify the must-have features that should be included in the proposed system.

2. **Planning and Design**

After analyzing the requirements in the first phase, the next phase is to plan and design MealCompass. These requirements are broken down into several components such as the algorithmic design, database schema, architecture design and the user interface design. (Senarath, Udesh S, 2021) The software architecture diagram was designed to show an overview of how different technologies communicate with each other in the application. During this phase, the name of the system, MealCompass, was also established.

3. **Development**

The third phase of the waterfall method is the development phase. It is where the objectives, requirements and design specifications of the system are translated into the mobile application through programming. This phase takes the longest time as it involves data collection, data preprocessing, training and evaluation for the recommendation system. After that, the mobile application and database will be developed based on the user interface sketches. The recommendation model is then integrated into the mobile application.

4. **Testing**

After the development phase, thorough testing is conducted to ensure that all objectives and requirements are met, and that MealCompass operates smoothly without any bugs. This testing phase will include two functional testing methods and one non-functional testing method. Integration testing tests if the combination of individual modules or components will cause faults or not and unit testing checks if an individual unit of the function or a code works flawlessly. Furthermore, for non-functional testing, user acceptance testing is selected to allow users to test out the recommendations given by the system first before deployment to see if there are improvements needed. User feedback will be collected to determine the accuracy of the recommendations.

5. **Deployment**

The deployment phase involves releasing the final product of MealCompass to the general public. This involves packaging the application into a suitable format and

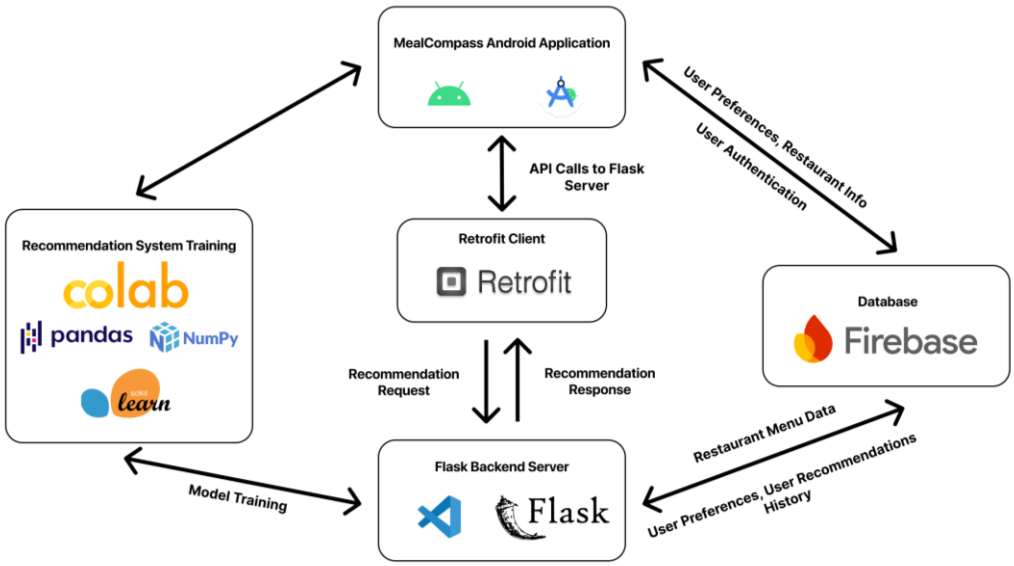
publishing it on the Google Play Store. However, since there are no requirements to publish the application, it will only be installed on devices locally solely for demonstration purposes.

6. Maintenance

The final phase is the maintenance phase, which involves continuously receiving feedback from users and improving the performance and quality of the application after deployment. This phase makes sure that bugs encountered are immediately addressed. Additionally, new features received from user feedback can also be considered and updated in the application to keep the application relevant with the current technological advancements.

Architecture Diagram

Figure 2. Architecture Diagram



The diagram above visualizes the entire software architecture of the MealCompass Android Application. The frontend, where users interact and receive recommendations, browse restaurants and menu items or connect with helpdesk, is developed in Android Studio. The data of users, restaurants, menu items, discover articles as well as helpdesk chat history is stored in Firebase Cloud Firestore, while images are stored in Firebase Storage. Moving on, the recommendation system is trained in Google Colaboratory, which provides seamless integration with Google Drive and is already preinstalled with thousands of libraries used for machine learning. After training the recommendation system with libraries such as Pandas, NumPy and Scikit-learn, the model is then exported to the Flask Server. This server which runs in Visual Studio Code is used for hosting the recommendation model and generating recommendations for each user. Additionally, Visual Studio Code was used for scraping restaurant data from the web and also was used to upload the data of restaurants and menu items collected during the data collection phase, into Cloud Firestore using Node.js. Lastly, the Retrofit client acts as a bridge between the Android application and the Flask server hosting the recommendation model. It handles making network requests and receiving responses for real-time recommendations to users.

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RESULTS

MealCompass Android Application

Figure 3. User Preferences Registration

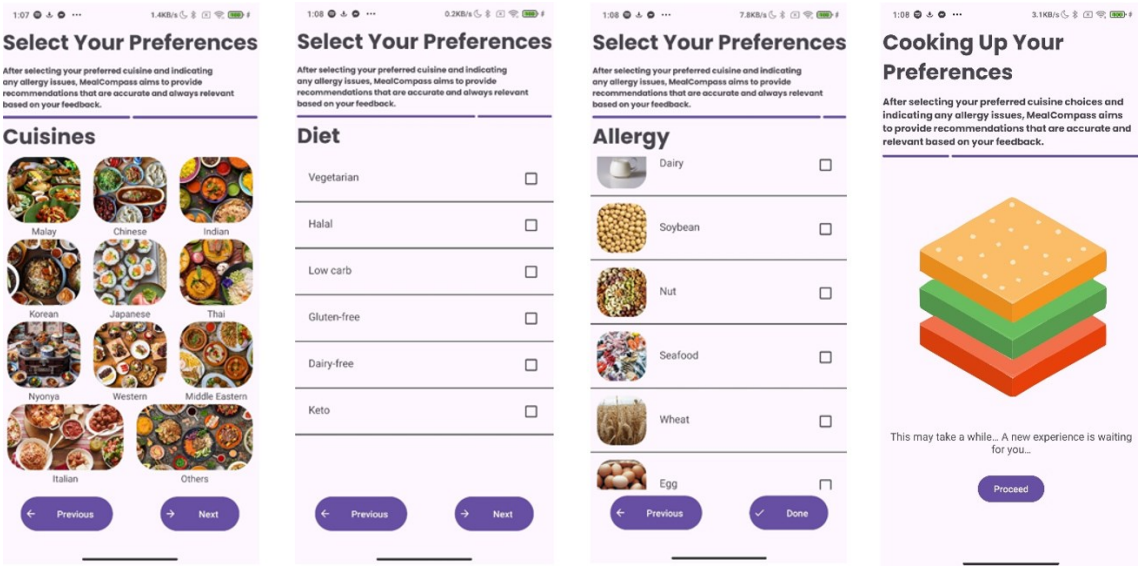

Figure 3 above shows the whole process of registering cuisine preferences, diet choices and allergens indication, if any. This process is crucial as it generates food recommendation based on the choices of the user. After completing this step, the user will be brought to the onboarding page before proceeding to the homepage, where the recommendations are generated and shown.

Figure 4. Restaurant Recommendation Result

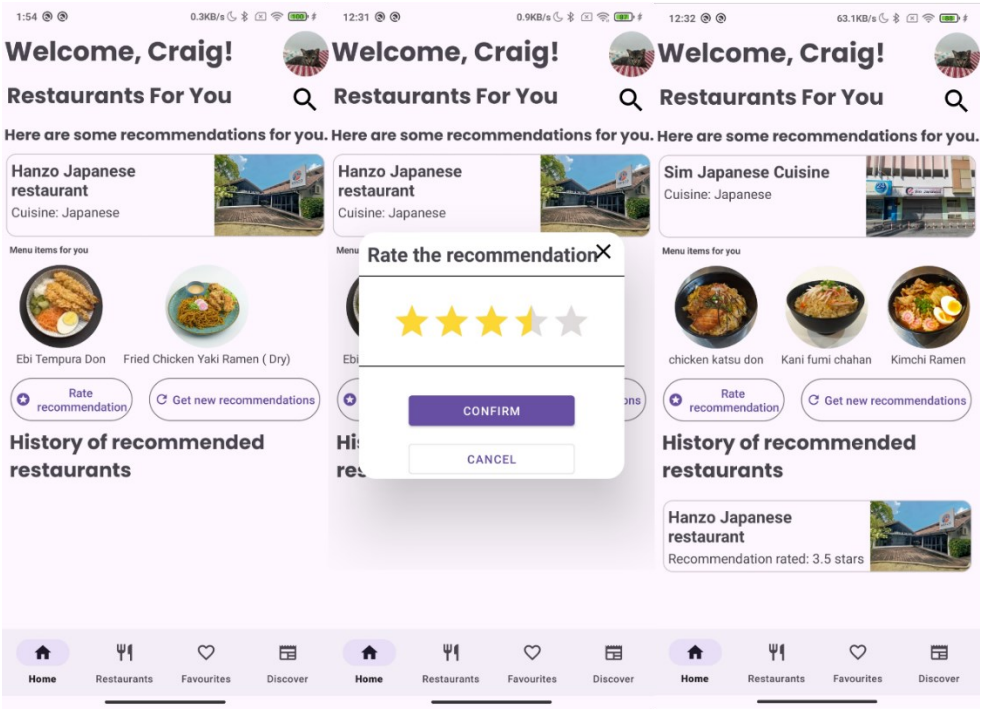

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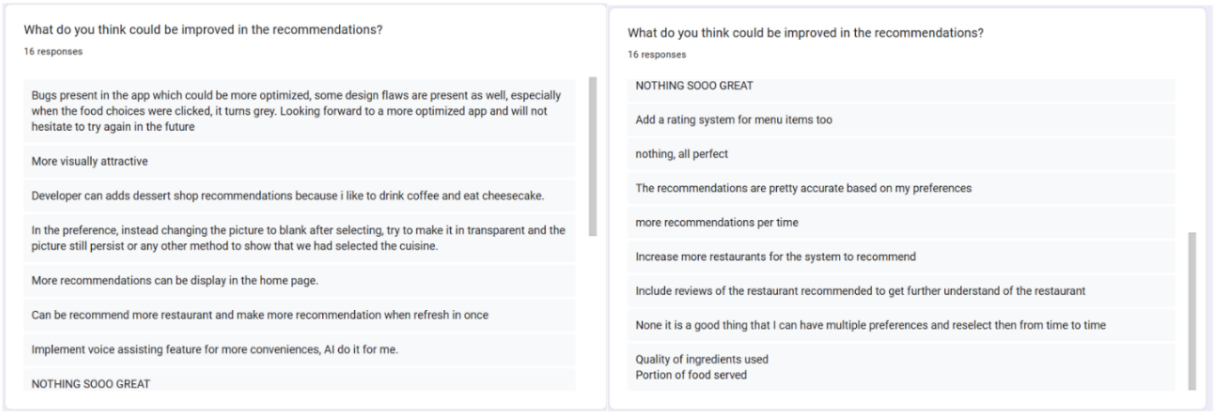
Figure 4 shows the homepage of MealCompass. On the homepage, users are greeted with the recommendations of a restaurant and up to three menu items. If there is a history of recommendations, the restaurants along with the rating given to the recommendation is shown at the bottom of the page. Users are required to rate the current recommendation before generating new recommendations to improve future recommendations. Users also have the option to reselect preferences in the settings.

User Acceptance Testing

Table 2. Results of User Acceptance Testing

Question	Number of Responses		
	Bad	Neutral	Good
1. What is your overall impression of the food recommendation system?	1	5	10
2. How accurate were the food recommendations?	0	1	15
3. How relevant are the recommendations to your overall cuisine preferences?	0	0	16
4. How easy was it to use the food recommendation system?	0	1	15
5. How satisfied are you with the variety of food options recommended?	0	0	16
6. Does the system exclude dishes containing allergens from your recommendations (if any)?	Yes: 14 No: 2		
7. How helpful were the food recommendations in finding new restaurants to try?	0	1	15
8. How easy is it to update your cuisine preferences, dietary and allergy restrictions and favourite restaurants in your profile?	0	1	15
9. How satisfied are you with the speed at which the system generates recommendations after you input or modify your preferences?	0	1	15
10. How likely are you to recommend the food recommendation system to others?	0	0	16
11. What do you think could be improved in the recommendations?	Open-ended responses, See Figure 5 below		

Figure 5. Results of Eleventh Question



As shown in Figure 5, the final question gathers feedback from all the respondents on potential improvements. A respondent mentioned that the application contained several design flaws. This feedback has been considered and has been improved. There were also suggestions to recommend more restaurants at once to provide more choices for the user. Some users also mentioned that a rating on menu items should be implemented to get more personalized recommendations on menu items. Finally, reviews of restaurants could also be shown in the application to let users who have been recommended to new restaurants understand better about the restaurant and also the quality and portion of food served.

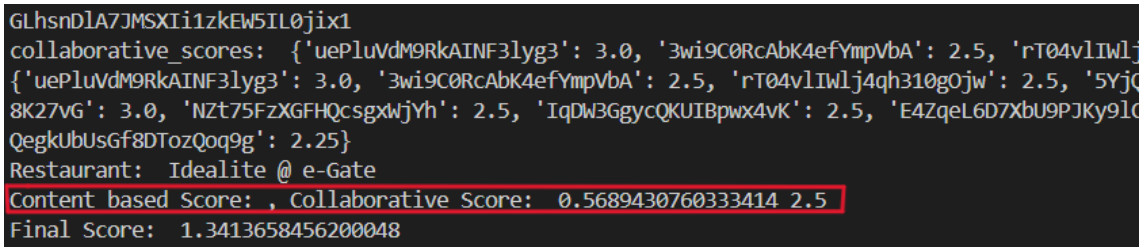
The user acceptance testing carried out among 16 respondents demonstrated positive responses regarding the relevancy and accuracy of the recommendations generated. The speed and diversity of the recommendations were also satisfactory. The Flask server was also tested to see if users could request recommendations and that recommendations could be sent and viewed on the MealCompass application.

DISCUSSION

Achievements

The MealCompass project is considered a success for achieving the three main objectives outlined at the start of the project. The first objective is to develop a food recommendation system that could generate personalized food suggestions based on user preferences and feedback. This has been successfully accomplished in the MealCompass Android application, which uses a hybrid recommendation system that combines content-based filtering and user-based collaborative filtering approaches.

Figure 6. Log of the Hybrid Recommendation System



As shown in Figure 6, the logs from the recommendations confirm that the similarity score for a restaurant recommended using the hybrid approach is much higher compared to recommendations only by content-based filtering. This outcome is consistent with the results of the literature review, which highlighted the better performance of hybrid recommendation systems over traditional single approaches.

Next, MealCompass also manages to achieve its second objective which is to enable users to find suitable and healthy options. This objective was achieved by allowing users to select dietary preferences and indicate any allergies during the registration process or anytime on the profile page. This function ensures that the recommendation system will filter out and recommend the next best menu items to users. In addition to that, each menu item was detailed with allergies containing in the specific food item and also calorie counts so that health-conscious users can keep track of the meal intake each day effectively.

The third objective was to allow restaurant owners to provide and frequently update nutritional information for the menu items served in the restaurant. The purpose of this objective is to allow users to access full details about the food served in a restaurant which is hard to find on the Internet these days. This objective is achieved through introducing a role in the system for restaurant owners. Restaurant owners in the system can manage menu items to provide the latest information and also update restaurant details if needed.

Additional achievements from this project include implementing an admin role for the system, to manage the whole application. Admins can publish articles related to healthy eating habits to improve the wellbeing of the users of the application and increase awareness of eating healthily. In addition to that, admins also oversee restaurant requests. A helpdesk feature that enables real-time messaging between users also allows users to get in touch with administrators to describe any problems facing in the application. If a user is detected in manipulating the recommendation system, purposely providing negative ratings for recommendations, admins have the authority to remove users from the system. For strong security and system integrity, only admins are allowed to register new admins into the MealCompass application.

Overall, MealCompass is a robust food recommendation system that simplifies the thought process for dining options based on user preferences. This application also empowers users to discover healthy eating options and provides a platform for restaurants to provide a comprehensive and detailed menu that contains nutritional information.

Limitations

Despite its achievements, MealCompass has several limitations. For instance, the recommendations are only limited to about 180 restaurants in Penang, Malaysia, which is a small scope. The registration of more restaurant owners can enable more restaurants to be added in the future to provide more diverse restaurant recommendations to users all over the country.

Another limitation of MealCompass, which is highly received from the responses of the user acceptance testing is that the current application only recommends one restaurant along with three menu items. Users prefer to get more sets of restaurant recommendations each time, offering more choices to choose from each recommendation.

The last limitation of MealCompass is that users are required to be connected to the same local network as the Flask server in order to receive recommendations. This is because recommendations are locally hosted by the Flask server. This limitation provides a major impact on users who are always on the go and not connected to a local network.

Future Enhancements

In the future, MealCompass aims to provide constant updates to the application in order to keep the application free of bugs and also to continuously improve user experience. Some future enhancements that will be done include improvements to the user interface. This includes the addition of animations when interacting with the application such as navigating between fragments and also application logo animations during the registration process.

Feedback received from user acceptance testing such as generating more sets of recommendations each time and also rating the menu items to receive a more personalized recommendation will also be updated in future versions of the application. The ability to provide a review and look at reviews of restaurants can be implemented to allow users who are unfamiliar with the recommended restaurant to know more about how other patrons feel about the restaurant.

Additionally, the implementation of in-app notifications to remind users to open the application for getting a recommendation on where to eat during lunch or dinner hours is useful. This can encourage consistent usage of the application and improve data collection for refining recommendations that can benefit both the user and similar users. In the future, the recommendation system will be deployed to the cloud to allow users to receive recommendations on-the-go, as long as there is an Internet connection. This not only improves the overall system but also dismisses a major limitation to the MealCompass application.

CONCLUSION

In conclusion, MealCompass is an innovative food recommendation system that incorporates machine learning to recommend food to deliver personalized food recommendations based on user preferences such as cuisine choices, dietary needs, and allergy considerations. The objectives of this project include developing a food recommendation system that adapts to user preferences and feedback, developing an application that helps users to find healthier dining options and also allowing restaurant owners to provide detailed nutritional information on each food served.

A thorough literature review confirmed that hybrid recommendation systems are more accurate than traditional collaborative filtering or content-based filtering approaches. The research methodology used for the development of the application was the waterfall model which is appropriate for a project with clear objectives.

The development of the recommendation system on Google Colaboratory involved key processes such as data collection, data preprocessing, implementation of content-based recommendations, user-based collaborative filtering, and finally, combining these into a hybrid model. The development of the Android application was done in Android Studio using Java, with Firebase as the backend. Flask and Retrofit were used for communication between the application and the recommendation engine.

All unit and integration test cases passed successfully, guaranteeing that the MealCompass application is free of bugs. User acceptance tests conducted among 16 respondents received positive feedback, indicating that the recommendations were accurate and satisfiable. Analysis of backend logs showed that the similarity scores for hybrid recommendations were superior to those of single-method approaches, aligning with the findings of the literature review. The limitations noted will be improved in future enhancements.

With all research objectives and questions completely fulfilled and answered, MealCompass is a robust application where users can open up each time when thinking about where to eat next, providing a simple and fun experience to be recommended food by their cuisine preferences and feedback.

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DECLARATION OF CONFLICTING INTERESTS

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

Afoudi, Y., Lazaar, M., & Al Achhab, M. (2021). Hybrid recommendation system combined content-based filtering and collaborative prediction using artificial neural network. *Simulation Modelling Practice and Theory*, *113*, 102375. https://doi.org/10.1016/j.simpat.2021.102375

Akhtar, S., Nasir, J. A., Ali, A., Asghar, M., Majeed, R., & Sarwar, A. (2022). Prevalence of type-2 diabetes and prediabetes in Malaysia: A systematic review and meta-analysis. *PLoS One*, *17*(1), e0263139. https://doi.org/10.1371/journal.pone.0263139

Amanuel Melese. (2021). Food and restaurant recommendation system using hybrid filtering mechanism. *NORTH AMERICAN ACADEMIC RESEARCH (NAAR) JOURNAL*, *4*(4), 268–281. https://doi.org/10.5281/zenodo.4712849

Ares, G., Lucía Antúnez, Curutchet, M. R., & Giménez, A. (2023). Warning labels as a policy tool to encourage healthier eating habits. *Current Opinion in Food Science*, *51*, 101011. https://doi.org/10.1016/j.cofs.2023.101011

Atlassian. (2023). *Waterfall Methodology for Project Management*. Atlassian. https://www.atlassian.com/agile/project-management/waterfall-methodology

C. Channarong, C. Paosirikul, S. Maneeroj, & A. Takasu. (2022). HybridBERT4Rec: A Hybrid (ContentBased Filtering and Collaborative Filtering) Recommender System Based on BERT. *IEEE Access*, *10*, 56193–56206. https://doi.org/10.1109/ACCESS.2022.3177610

Chan, C., Kee, D., Chong, E., Hak, K., Yeong, P., Stephani, S., Sara, H., Chanchal, B., Quttainah, ajdi, Pandey, R., & Sin, L. (2020). The challenges of healthy lifestyle: A study case of kentucky fried chicken. *International Journal of Tourism and Hospitality in Asia Pasific*, *3*, 57–69. https://doi.org/10.32535/ijthap.v3i2.823

Chavan, P., Thoms, B., & Isaacs, J. (2021). *A Recommender System for Healthy Food Choices: Building a Hybrid Model for Recipe Recommendations using Big Data Sets*. https://doi.org/10.24251/HICSS.2021.458

Chua, B.-L., Karim, S., Lee, S., & Han, H. (2020). Customer Restaurant Choice: an Empirical Analysis of Restaurant Types and Eating-out Occasions. *International Journal of Environmental Research and Public Health*, *17*(17), 6276. ncbi. https://doi.org/10.3390/ijerph17176276

Fu, L., & Ma, X. (2021). An Improved Recommendation Method Based on Content Filtering and Collaborative Filtering. *Complexity*, *2021*(1), 5589285. https://doi.org/10.1155/2021/5589285

Nouh, R., Lee, H.-H., Lee, W.-J., & Lee, J.-D. (2019). A Smart Recommender Based on Hybrid Learning Methods for Personal Well-Being Services. *Sensors*, *19*(2), 431. https://doi.org/10.3390/s19020431

Pfordten, D. (2023, October 3). *INTERACTIVE: From eating out to staycations, "revenge spending" is on the rise*. The Star. https://www.thestar.com.my/news/nation/2023/10/03/interactive-heres-how-we-spent-our-money-last-year#:~:text=PETALING%20JAYA%3A%20Eating%20out%20and

Pitol, Md. N. S., & Sapir, A. S. Md. (2023). COVID-19: introduction of a new lifestyle and diet among the Malaysians. *Bulletin of the National Research Centre*, *47*(1). https://doi.org/10.1186/s42269-023-00979-1

Reutskaja, E., Lindner, A., Nagel, R., Andersen, R. A., & Camerer, C. F. (2018). Choice overload reduces neural signatures of choice set value in dorsal striatum and anterior cingulate cortex. *Nature Human Behaviour*, *2*(12), 925–935. https://doi.org/10.1038/s41562-018-0440-2

Senarath, Udesh S. (2021). *Waterfall Methodology, Prototyping and Agile Development*. https://doi.org/10.13140/RG.2.2.17918.72001

Shangguan, S., Afshin, A., Shulkin, M., Ma, W., Marsden, D., Smith, J., Saheb-Kashaf, M., Shi, P., Micha, R., Imamura, F., & Mozaffarian, D. (2019). A Meta-Analysis of Food Labeling Effects on Consumer Diet Behaviors and Industry Practices. *American Journal of Preventive Medicine*, *56*(2), 300–314. https://doi.org/10.1016/j.amepre.2018.09.024

Tewari, A. S. (2020). Generating Items Recommendations by Fusing Content and UserItem based Collaborative Filtering. *International Conference on Computational Intelligence and Data Science*, *167*, 1934–1940. https://doi.org/10.1016/j.procs.2020.03.215

Togas, P. V., Orbanus Naharia, Hiskia Manggopa, Parabelem D.T Rompas, & Rolly Oroh. (2021). Development of Web-Based Digital System Learning Media. *Asia Pacific Journal of Management and Education (APJME)*, *4*(3), 22–34. http://www.ejournal.aibpmjournals.com/index.php/APJME/article/view/1263/1145

Tunde, O. A., Kuek, T. Y., Mohan, N., Rastogi, G., Bhatt, G., Singh, H., Sholikhah, M., Murugesan, V. A., Ganeson, V. A., Wong, Y. J., Yap, C. Y., Wardina, A., Hassan, B. M., & Kee, D. M. H. (2023). Fast-Food Consumption Patterns among University Students: A Case Study of McDonald's in Malaysia. *Asia Pacific Journal of Management and Education (APJME)*, *6*(2), 104–115. https://doi.org/10.32535/apjme.v6i2.2450

World Obesity Federation. (2023). *World Obesity Day Atlases | Obesity Atlas 2023*. World Obesity Federation Global Obesity Observatory. https://data.worldobesity.org/publications/?cat=19

Y'ng, K. W. Y., & Ming, P. D. M. F. (2023, March 8). *Fast-food and obesity*. Thesun.my. https://thesun.my/home_news/fast-food-and-obesity-DE10722890

Zainuddin, N., Ismail, Z., Elias, S., & Jamaludin, M. (2023). E-ISSN: 2226-6348 © 2023 HRMARS In-Text Citation: (Halim et al., 2023) To Cite this Article: Halim, A. *International Journal of Academic Research in Progressive Education and Development*, *12*(1), 1720–1726. https://doi.org/10.6007/IJARPED/v12-i1/16514

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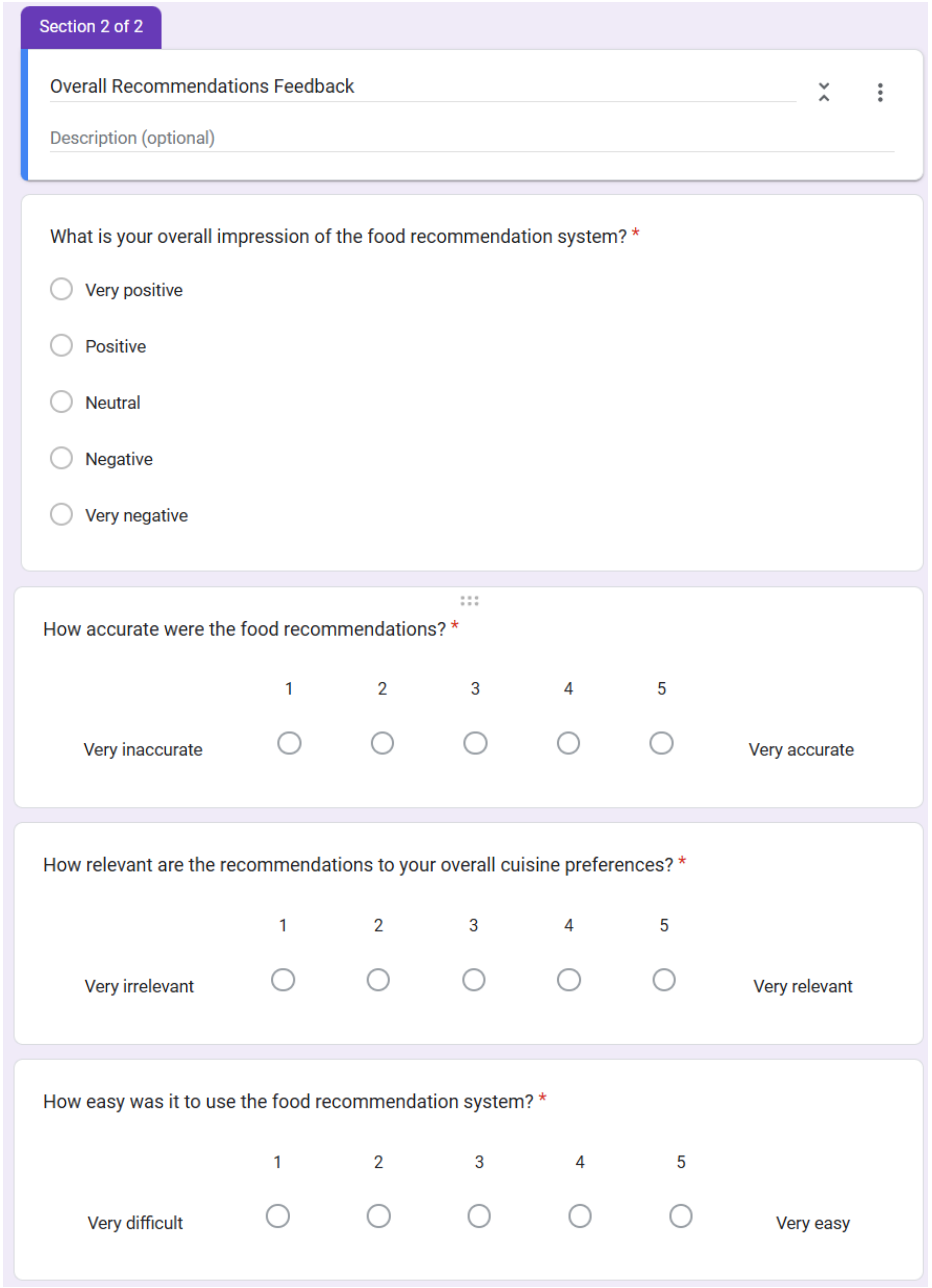
APPENDIX

User Acceptance Testing Questionnaire



Section 2 of 2

Overall Recommendations Feedback

Description (optional)

What is your overall impression of the food recommendation system? *

- Very positive
- Positive
- Neutral
- Negative
- Very negative

How accurate were the food recommendations? *

	1	2	3	4	5	
Very inaccurate						Very accurate

How relevant are the recommendations to your overall cuisine preferences? *

	1	2	3	4	5	
Very irrelevant						Very relevant

How easy was it to use the food recommendation system? *

	1	2	3	4	5	
Very difficult						Very easy

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How satisfied are you with the variety of food options recommended? *

	1	2	3	4	5	
Very dissatisfied	○	○	○	○	○	Very satisfied

Does the system exclude dishes containing allergens from your recommendations (if any)? *

- ○ Yes
- ○ No

How helpful were the food recommendations in finding new restaurants to try? *

	1	2	3	4	5	
Not at all helpful	○	○	○	○	○	Extremely helpful

How easy is it to update your cuisine preferences, dietary and allergy restrictions and favourite restaurants in your profile? *

	1	2	3	4	5	
Not at all easy	○	○	○	○	○	Extremely easy

How satisfied are you with the speed at which the system generates recommendations after you input or modify your preferences? *

	1	2	3	4	5	
Very unsatisfied	○	○	○	○	○	Very satisfied

How likely are you to recommend the food recommendation system to others? *

	1	2	3	4	5	
Not at all likely	○	○	○	○	○	Extremely likely

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