DIET AND HEALTHY FOOD MANAGEMENT APPLICATION

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ABSTRACT

With the increasing awareness of healthy living, there is a growing demand for platforms that integrate diet management with social interaction. However, due to limited channels for obtaining reliable health information, insufficient interactive platforms, and low content management efficiency, users face numerous challenges in developing healthy eating habits. To address these issues, this study aims to design and develop a "Healthy Eating" application that offers users a convenient experience for managing their diets and engaging with a health community. The application is developed using Android Studio, with Firebase as the primary backend to ensure the secure storage and management of user data. An incremental development approach is employed to progressively implement core functional modules—such as recipe uploads, forum interactions, health announcements, and Food Nutrition and Pairing information—with testing conducted at each stage to ensure highquality development and smooth operation. This application effectively resolves the issues of limited access to reliable health information and inadequate channels for community discussion, enhancing the convenience of diet management, improving the accessibility of health-related content, and promoting meaningful community interactions. Moreover, the application distinguishes between administrators and general users: in addition to general user permissions such as registration, login, management of personal data, browsing content, posting and interaction, administrators also have higher management permissions, including publishing announcements, managing health information and food nutritional value and pairing content, and deleting inappropriate posts and comments, thereby ensuring the reliability and security of platform content.

1 ITRODUCTION

With the popularization of mobile Internet, the needs of people who love food but cannot cook and are keen on cooking communication have gradually given rise to numerous recipe applications (Liu Kuang. 2017). Recipe apps not only teach people how to cook, but also allow users to share recipes and exchange cooking experiences, so they have attracted a large number of young users in a short period of time. Food recipe apps are also growing in defining people's attitudes toward healthy living. With the continuous development of healthy eating and food culture, more and more people are paying attention to food nutrition and cooking skills. In this fast-paced world of convenience foods and busy schedules, the importance of healthy cooking cannot be overstated. In addition to the obvious benefits of maintaining a balanced diet, making nutritious meals at home can boost overall health in ways that extend beyond physical health. The significance of creating a food community is to create a platform for a group of people with the same hobbies and needs for food to exchange experiences and learn from each other. On the one hand, healthy eating apps are recipe-centric, allowing users to communicate by uploading dishes made with reference to recipes. Each recipe will be edited repeatedly by users, and the recipes will be continuously improved through constant modifications by users. In addition, users are more likely to become friends when exchanging information around their interests, thus forming a good atmosphere of a food community. On the other hand, food communities emphasize community and encourage users to interact, communicate, and actively create, thereby creating a prosperous community ecology. In short, healthy eating is an important part of self-care. We not only need to know how to eat more fruits, vegetables, and whole grains, but people also need t o know more about the common sense of healthy eating. A healthy diet is essential for good health and nutrition, and it protects you from many chronic non-communicable diseases such as heart disease, diabetes, cancer, etc. Therefore, it is worthwhile to develop a recipe application with rich functions, which can be named a healthy eating application, to better meet the comprehensive needs of the majority of food lovers.

2 PROBLEM STATEMENT

Most of the recipe apps currently on the market have single functions, They are inconvenient to use, have incomplete data, and so on. They cannot meet the comprehensive needs of users and affect the user experience. Specifically, there are four aspects:

1. The user interface is not simple and intuitive enough, and it is not convenient for new users to use.
2. Lack of a platform to provide reliable health information: There are still many people who are not aware of their unhealthy cooking habits. For example, high-temperature oil not only destroys the nutrients of food, but also produces some peroxides and carcinogens. Or eating too much salt can cause upper respiratory tract infections, making people lose the ability to resist diseases. When people want to know these health tips, there is no platform that provides enough information for them to check.
3. Lack of a separate interactive communication platform for sharing food and discussing issues: Some related recipe applications do not have forum interaction functions, and some limit interactions to certain recipes, affecting user experience.
4. Lack of information on the nutritional value and matching suggestions of food: Most people usually don’t know that certain ingredients cannot be combined, such as alcohol and persimmon fruits or the negative effects of processed foods. Maybe their parents and friends don’t know this knowledge, so no one reminds them when they eat something wrong. Then, people who care about healthy eating will definitely want to know this knowledge.

3 OBJECTIVES

1. To propose comprehensive diet and health management knowledge.

2. To develop a mobile application for diet and healthy food management.

3. To evaluate the app in terms of its usability.

4 METODOLOGY

The incremental model is a software development methodology that divides the system into small, manageable parts (increments), with each increment representing a portion of the system's functionality. Each increment undergoes the phases of requirements, design, implementation, and testing, and is developed and delivered separately. The first increment produces a working version of the software early in the development lifecycle, allowing for continuous testing and refinement. Subsequent increments add functionality to the previous version, and this process continues until the entire system is complete. This approach ensures flexibility, early delivery of a functional product, and easier debugging and testing as the system grows incrementally.

4.1 Planning Phase

This phase is a crucial phase in system development, laying the foundation for the success of the project. In this phase, user needs will be clarified, key issues in system development will be identified, and project goals, scope, resource allocation plans and schedules will be developed to ensure the smooth progress of subsequent phases. In addition, by developing a clear and effective development cycle plan, potential problems can be proactively identified before development begins, thereby avoiding impacts on the development process and ensuring that the required time and resources are fully guaranteed.

4.2 Analysis Phase

This phase focuses on analyzing system requirements. Functional and non-functional system requirements will be identified to facilitate the system architecture process. In addition, existing systems will be analyzed to identify certain weaknesses, deepen the understanding of how to develop systems with similar concepts, actively seek alternatives, and conduct research and analysis to determine the needs of end users.

4.3 Design Phase

During this phase, making decisions about the software's structure, how data is stored, and what parts the software will have. These decisions help make sure that the software can do everything it needs to do.

The first goal is to convert the requirements into complete and detailed system design specifications. In this, system architecture, database design, modules, and interfaces are defined which are required for development.

When the design specifications are finalized and approved, When the design specifications are finalized and approved, development work begins.

These objectives and goals help in understanding the importance of the design phase. A good design makes the software development process smoother and the final product meets the expected standards.

4.4 Implementation Phase

The Implementation Phase is where the system design is converted into a functional system through coding and development. This phase involves writing code, developing modules, conducting unit testing, and integrating components to ensure they work together seamlessly. The goal is to deliver a working system that meets the design specifications and lays the groundwork for further testing and deployment.

4.5 Testing Phase

The system will be tested to see if it can achieve the objectives. The system will be tested by the target users to determine its effectiveness. Survey feedback will also be conducted to determine the user-friendliness of the developed system. This will ensure that each module works properly and meets the needs of the users.

5 RESEARCH RESULTS

The healthy eating app is developed using the Kotlin programming language and the database used is Cloud Firestore. The software used is Android Studio.

Figure 1 shows the user login interface. After the application is started, the login interface is used as the entry point. The user needs to enter a valid email address and password, and click the "Login" button to enter the main interface of the application. Unregistered users can click the "Don't have an account?" link to enter the registration interface. If the user forgets the password, he can click the "Forgot password" link to enter the password reset help interface.

Figure 1 User Login Interface

Figure 2 shows the user registration interface. Unregistered users need to fill in their user name, valid email address, and password on the registration interface and click the "Register" button to complete the registration.

Figure 2 User Registration Interface

Figure 3 shows the user forgets password interface. The registered user enters the email address used when registering on this interface and clicks the "Reset" button. The system will send an email containing a password reset link to the email address provided by the user. The user needs to complete the password reset operation through the link in the email. The password reset process is completed in the email client. The application interface does not support direct password reset.

Figure 3 User Forgot Password Interface

Figure 4 This page is the main page that users see after successfully logging in. It provides access to various functions of the application, including: Upload a recipe (Post a Recipe)

• Users click anywhere in the card area where the green "plus" button is located to jump directly to the edit and publish page for uploading recipes. Forum post display (Diet Forum):

• The "Diet Forum" module in the middle of the page displays the latest forum posts, providing post titles, publishing time, author information, and the number of likes and comments.

Users can:

• Click anywhere on the post card to enter the details page of the latest post published in the application.

• Click the "More" button in the upper right corner to jump to the post list interface to view all posts. Function shortcut entry: Two function buttons are provided at the bottom of the page:

• All Recipes: Enter the page of all recipe categories.

• All Ingredients: Enter the page of all ingredient categories.

Navigation bar:

The navigation bar at the bottom of the page provides users with shortcuts, namely:

• Home: Return to the homepage.

• Information: View article categories and related information.

• Account: Enter the personal account interface to view and manage user account information.

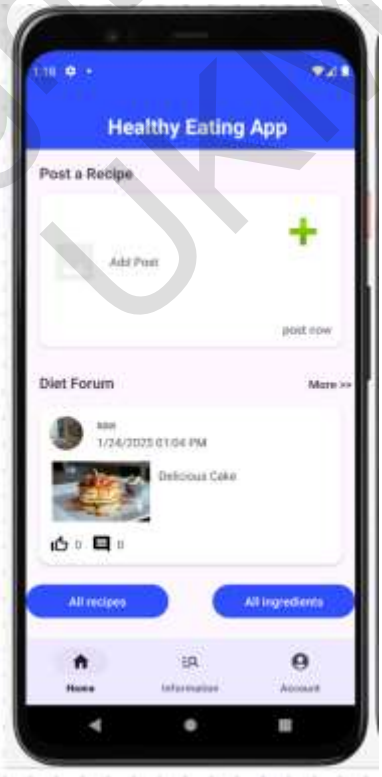
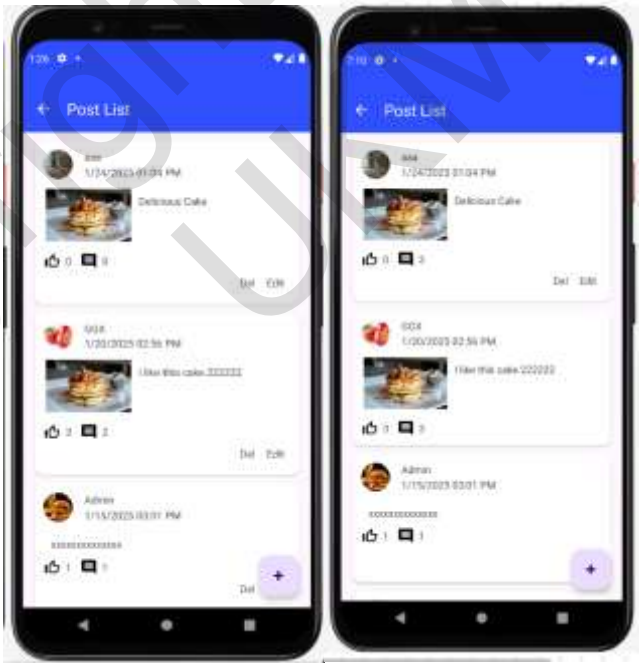


Figure 4 Home Interface

After the user clicks the "More" button on the right side of the Diet Forum module on the homepage (Figure 4), the user will jump to the post list page. In the post list, can view all posts posted by users, including title, author, post time, likes and comment data. At the same time, the user can click any post card in the post list to enter the details page of the post.

Figure 5 (a) shows the administrator post list interface. The delete and edit buttons are displayed in the lower right corner of all posts posted by users, because the post administrator has the authority to edit and delete posts posted by all users.

Figure 5 (b) shows the general user post list interface. Only the posts posted by general users themselves have the delete and edit buttons in the lower right corner. Because general users can only edit and delete their own posts, they only have the authority to view other people's posts. The plus button in the lower right corner of the post list interface can open the editing and publishing interface of new posts.



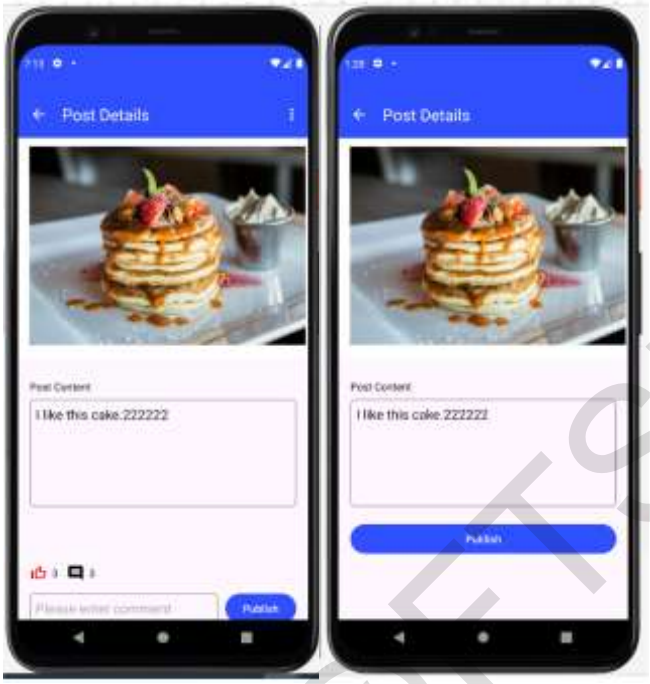
(a) (b)

Figure 5 Post List Interfaces for Administrators (a) and General Users (b)

Figure 6 shows that when an ordinary user visits the details interface of a forum post published by another user, there is no three-dot button in the upper right corner, and the post cannot be edited or deleted. However, the like and comment functions can be used to interact with the post.

Figure 6 Post Details Interface for Users Without Management Authority

Figure 7 (a) shows the post details interface. The difference from Figure 6 is that there is a three-dot button in the upper right corner of the details interface, indicating that the user has the authority to edit and delete the post. This happens when the administrator or ordinary user is the author of the post. Figure 7 (b) shows the editable state interface of the post details interface. Clicking the Edit button will enter this interface. After the user modifies the content, he needs to click the publish button to save.



(a) (b)

Figure 7 Post Details Interface with Management Permissions (a) and Edit Post Interface (b)

Figure 8(a) shows the comment list interface that appears when you are an administrator or a general user who is the author of a post. The delete button next to the comment indicates that the comment can be deleted. Because administrators can delete all comments in all posts, general users can delete all comments under their own posts. Figure 8(b) shows the interface of a general user accessing the comment list of other users' posts. In this case, general users can only delete their own comments, so only their own comments have a delete button next to them.

(a) (b)

Figure 8 Comment List Interfaces for Deleting All Comments (a) and Only Own Comments (b)

Figure 9 (a) shows the interface for all recipe categories. Users can enter this interface by clicking the "All Recipes" button on the homepage. Figure 9 (b) shows the recipe list interface. Users can enter the recipe list interface under this category by selecting a category (such as Pasta) in the All Recipes Categories Interface.

(a) (b)

Figure 9 Recipe Categories Interface (a) and Recipe List Interface (b)

Figure 10 shows the interface for adding a new recipe. Users enter this interface by clicking the "plus" button in the lower right corner of the recipe list interface. Users upload pictures, enter the title, introduction and ingredients details, preparation steps, and select the category field (such as noodles, fried rice, etc.). After the user completes the recipe details, click the publish button at the bottom, and the system's category will automatically bind to the selected recipe category list according to the user's selection.

Figure 10 Recipe Upload Interface

Figure 11 When general users view the recipe details interface posted by other users, there is no three-dot button in the upper right corner and they do not have the authority to edit or delete the post.

Figure 11 Recipe Details Interface Without Management Permissions

Figure 12 (a) shows the post details interface accessed by an administrator and a normal user as the author of the post. There is a three-dot button in the upper right corner, which can be used to edit and delete the post.

Figure 12 (b) The post details interface in an editable state after clicking the edit button.

(a) (b)

Figure 12 Recipe Details Interface with Management Permissions (a) and in Edit Mode (b)

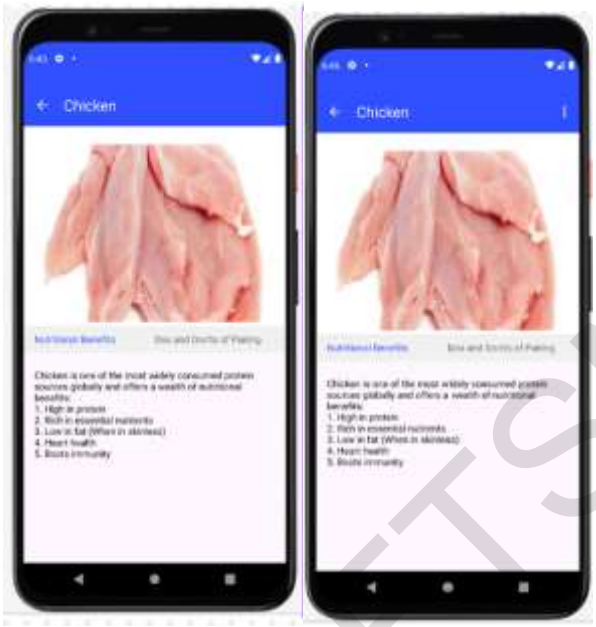
Figure 13 (a) shows the ingredient list interface for ordinary users. Each ingredient button can be clicked to enter the corresponding ingredient details interface.

Figure 13 (b) shows the ingredient list interface for administrators. The difference from (a) is the plus button in the lower right corner. Click the plus button to add new ingredients.

(a) (b)

Figure 13 The Ingredient List Interface for General Users (a) and Administrators (b)

Figure 14 (a) shows the ingredient details interface for ordinary users. The ingredient name is displayed in the upper left corner. The interface displays the ingredient picture, nutritional value and dos and don'ts pairing. Figure 14 (b) shows the ingredient details interface for administrators. The difference from Figure 14 (a) is the three-dot button in the upper right corner of the interface, which means that the administrator has the authority to edit and delete ingredients.

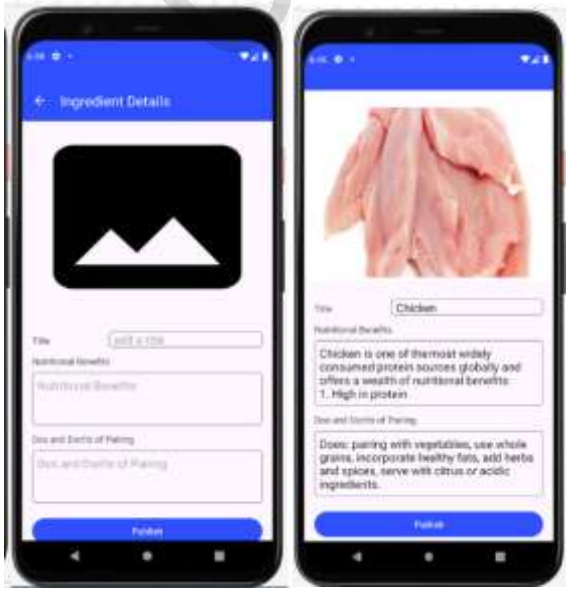


(a) (b)

Figure 14 The Ingredient Details Interface for General Users (a) and Administrators (b)

Figure 15 (a) shows the ingredient upload interface, where the administrator needs to upload a picture, enter the nutritional value and dos and don'ts pairing. Then click the Publish button to save.

Figure 15 (b) shows the ingredient details interface in an editable state.



(a) (b)

Figure 15 Ingredient Upload Interface (a) and Editable Ingredient Details Interface (b)

Figure 16 shows the health announcement topic interface that the user enters by clicking the information button in the navigation bar. Each health topic category can enter the corresponding article list interface.

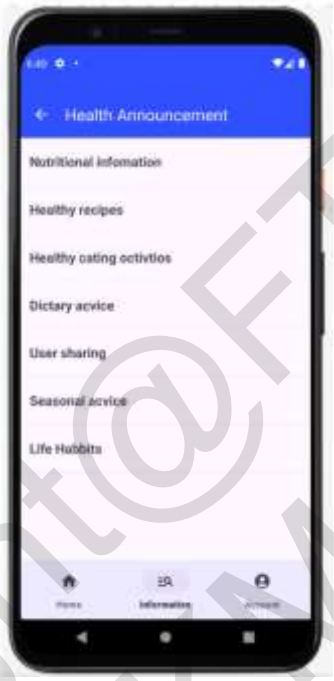
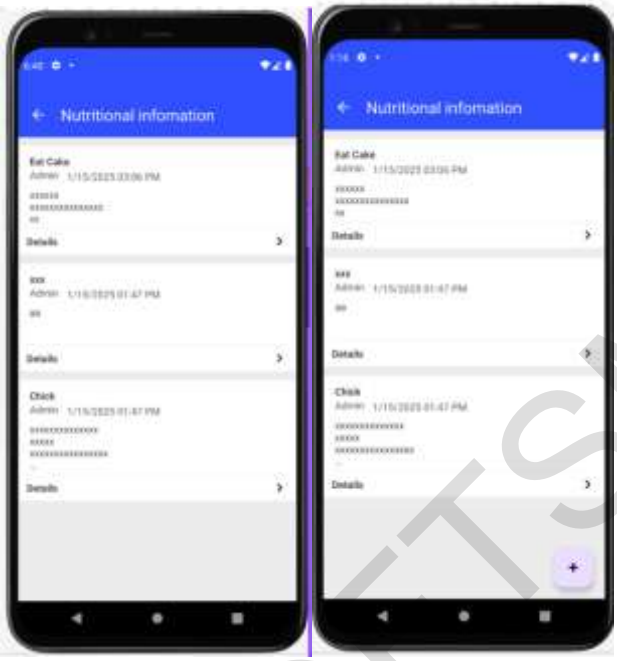


Figure 16 Health Announcement Interface

Figure 17 (a) shows the article list interface for general users, showing a list layout with title, author, time, summary information and details button. The preview information of each article can attract users to choose to enter the article details interface.

Figure 17 (b) shows the article list interface for administrators. The difference from (a) is the plus button in the lower right corner, indicating that the administrator can add new articles.



(a) (b)

Figure 17 Article List Interfaces for General Users (a) and Administrators (b)

Figure 18 (a) shows the article details interface for ordinary users, including pictures, article title, and article content.

Figure 18 (b) shows the article details interface for administrators. The difference from (a) is the three-dot button in the upper right corner, indicating that the administrator can edit and delete the article.

(a) (b)

Figure 18 Article Details Interface for General Users (a) and Administrators (b)

Figure 19 Shows the article details interface in an editable state that the administrator enters after clicking the Edit button.

Figure 19 Article Details Edit Interface

Figure 20 Shows administrators need to upload pictures, article title and article content when uploading articles. Then click the Publish button to save.

Figure 20 Upload Article Interface

Figure 21 (a) shows that the user account interface records all the recipes posted by the user. Click the box where each recipe is located to enter the recipe details interface for update.

Figure 21 (b) shows that the user account interface records all the forum posts posted by the user. Click the box where each forum post is located to enter the post details interface for update.

(a) (b)

Figure 21 Recipe Records (a) and Forum Records (b) in Personal Account

Figure 22 shows the message notification interface. Users can view this interface through the notification button in the upper right corner of the personal account interface. The interface displays the interactive messages received by the user in a list, including notifications of posts being liked or commented on. Each notification contains the interaction time, type (like or comment) and title of the relevant post, making it convenient for users to view the interactive messages of forum posts.

Figure 22 Notification List Interface

Figure 23 shows the user profile interface, where the user can update avatar and username.

Figure 23 Profile Interface

6 CONCLUSION

Overall, this application has achieved its goal of providing a healthy diet management platform and social interaction. Although there are some challenges, such as reliance on cloud services, the app has laid a solid foundation for future development.

7 REFERENCE

TST Technology. (n.d.). Design process of SDLC: A complete guide for business foundation. Retrieved from https://tsttechnology.io/blog/design-process-of-sdlc [24 February 2025]

Itexus. (2024). The implementation phase in SDLC: A comprehensive guide. Retrieved from https://itexus.com/the-implementation-phase-in-sdlc-a-comprehensive-guide/ [24 February 2025]

SearchMyExpert. (2023). A guide to the development stage in app development. Retrieved from https://www.searchmyexpert.com/resources/app-development/development-stage [24 February 2025]

CloudDefense.AI. (n.d.). 7 phases of the system development life cycle guide. Retrieved from https://www.clouddefense.ai/system-development-life-cycle/ [24 February 2025]

Harness Team. (2023). The seven phases of the software development life cycle. Retrieved from https://www.harness.io/blog/software-development-life-cycle-phases [24 February 2025]

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