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Food Recipe Android Application

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ABSTRACT: The proposed project is an Android Application that will provide recipes to the users based onthe ingredients available with them. From a list of ingredients, the user has to select the availableingredients and then the application will display a list of recipes which will use the ingredientsselected by the user. The user will have filters to select the kind of recipe it wants and then theresult can be sorted and filtered according to the user' needs. The advancement in technology hasmade our lives easy like never before. Everything that we require is available at our fingertips.With a few taps on our smartphones, we can complete tasks in minimal time. From entertainmentto learning and from fitness to cooking, there are various applications for everything that weneed. With just a click of a button, you can get access to multiple recipes within a second. Eachrecipe provides you with all the information, from the ingredients required to each step requiredto cook the different parts of the dish. These applications are generally used by people who wantto try to make some new dish, or by people who live all by themselves, or by working peoplewho are always short on time. Even though there has been such a huge advancement intechnology, all these applications provide you with the ingredients required, and you must go andbuy the ingredients that are not available to you currently.

KEYWORDS: Food, Recipe, Android Application, Android Studio.

I. INTRODUCTION

Quick Recipes application is a very useful app for people who love to cook and try outnew recipes. Quick Recipes application provides user flexibility to search, share, save recipesfrom cloud with an additional capability to maintain personal cookbook for creating newrecipes, deleting recipes that are no longer required. My application "Quick Recipes" makesfinding recipes easy. Recipes are from everyday cooks and chefs that have perfected the recipeover time. Food2Fork API is used for searching recipes from the cloud. Recipes range from thedecadent to the simple for whatever mood the user is in. With recipes being added daily to theFood2Fork database there will always be something new for users to try. Recipes are from wellknownpublishers All Recipes,101 Cookbooks, Closet Cooking and many more.Quick RecipesApplication provides the capability to users to search top rated, trending recipes. Recipes aredisplayed with recipe images, title, ingredients list and cooking directions. Category based andingredients-based search is also provided to the user. Quick Recipes App provides sharing capability, giving users a choice to share recipes through Facebook, Twitter, Instagram andGmail. This application is a time saver providing recipes in few clicks. The user is given thechoice to create a personal cookbook, where the user can create recipes, view recipes and deleterecipes. The interface is clean and simple. It makes use of Android image button capability to display options on home screen with image icons. The user can search recipes, viewaddedfavorite recipe list and access personal cookbook all from home screen.

II. LITERATURE SURVEY

Navathe. Elmasri (2000)The World Health Organization identifies as a major issue the overall increase ofnon-communicable diseases such as premature heart diseases, diabetes and cancer, beenunhealthy diets an important causing factor of such diseases. In this context, personalizednutrition emerges as a new research field for providing tailored food intake advice to individualsaccording to their physical, physiological data, and further personal information. Specifically, inthe last few years several research have proposed computational models for personalized foodrecommendation using nutritional knowledge and user data. This paper presents a generalframework for daily meal plan recommendations, incorporating as its main feature thesimultaneous management of nutritional-aware and preference-aware information, in contrast toprevious works which lack of this global viewpoint. The proposal

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incorporates a pre-filteringstage that uses AHPSort as multi-criteria decision analysis tool for filtering out foods which arenot appropriate to the current user characteristics. Furthermore, it incorporates an optimizationbasedstage for generating a daily meal plan whose goal is the recommendation of food highlypreferred by the user, not consumed recently, and satisfying his/her daily nutritionalrequirements. A case study is developed for testing the performance of the recommender system.

De Almeida, Jorge Miguel Tavares Soares (2015)Making decisions about what and where to eat is a major problem in our everyday lives due to a wide variety of ingredients, culinary styles, ethnicities, cultures, and personal tastes. Choosing the right dish at the right time seems to be a very difficult task. Thus, this research proposes an integration of a deep neural network with a recommendation system with Thai food as our test domain. The proposed model extracts interesting ingredients from the set of recipes of user's favorite dishes that is given before using the system. The features are extracted from the analysis of favorite ingredients then a user profile is evaluated by a model of deep neural network (DNN). The system also collects the history of selected dishes along with user profile in a database. The model will predict the next dishes using a temporal prediction model on the profile and eating history. Satisfaction is analyzed through experiment based on whether user selected the recommended dishes or not which is calculated as hit ratio. In addition, the accuracy and variety of recommendations are also analyzed. From the experimental results, DNN model can predict the user profile with precision up to 90% and the accuracy of hit ratio is up to 89%.

Existing System

There are several applications in Android store for Recipes Search but none of them
support interface for searching, saving, and sharing recipes all at once. Quick Recipesis anAndroid application with image-based UI for searching, sharing, creating and saving recipes.This app provides flexibility to users to search top rated and variety of recipes from availablerecipes in cloud. This is a very handy application, which every user can search cloud for recipes,save recipe as favorite, share recipe with friends on social media like Facebook, Twitter,Instagram and Gmail and create personal cookbook. This app is timesaver providing recipes infew clicks. By combining ingredients and title search, Quick Recipes app makes finding recipeseasy. With recipes being added daily there will always be something new for the user to crave.

ExistingSystem Disadvantages

1. **Limited Functionality:** Many existing apps may only support one feature, such as searching for recipes, without options for saving or sharing them seamlessly.
2. **Lack of User-Centric Features:** Some apps may not offer personalized experiences, likecreating a personal cookbook or adding new recipes, which could limit their usefulnessfor users who want customization.
3. **Poor Search Optimization:** Many apps might lack an advanced search mechanism thatcombines ingredient and title search, making it harder for users to find specific recipesbased on what they have available.
4. **Slow Update Frequency:** Existing apps may not frequently add new recipes, leading to astagnant recipe collection that doesn't satisfy users looking for the latest or trendingdishes.

Proposed System

The advancement in technology has made our lives easy like never before. Everything that we require is available at our fingertips. With a few taps on our smartphones, we can complete tasks in minimal time. From entertainment to learning and from fitness to cooking, there are various applications for everything that we need. With just a click of a button, you can get access to multiple recipes within a second. Each recipe provides you with all the information, from the ingredients required to each step required to cook the different parts of the dish. These applications are generally used by people who want to try to make some new dish, or by people who live all by themselves, or by working people who are always short on time. Even though there has been such a huge advancement in technology, all these applications provide you with the ingredients required, and you must go and buy the ingredients that are not available to you currently.

Proposed System Advantages

- Ingredient-Based Recipe Suggestions: The app allows users to select available ingredients, providing recipes that use those specific items, making it convenient for those who want to avoid extra shopping.

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- Users can apply filters to narrow down recipe types (e.g., vegan, quick meals, etc.) and sort results based on preferences, offering a personalized experience.
- Certain features or saved recipes can be accessed offline, enabling users to view instructions without needing internet connectivity.
- Users can easily share recipes via social media or messaging platforms, allowing them to share favorite dishes with friends and family.
- With a simple and intuitive design, users of all levels can navigate the app comfortably, finding recipes quickly and efficiently.

System Architecture

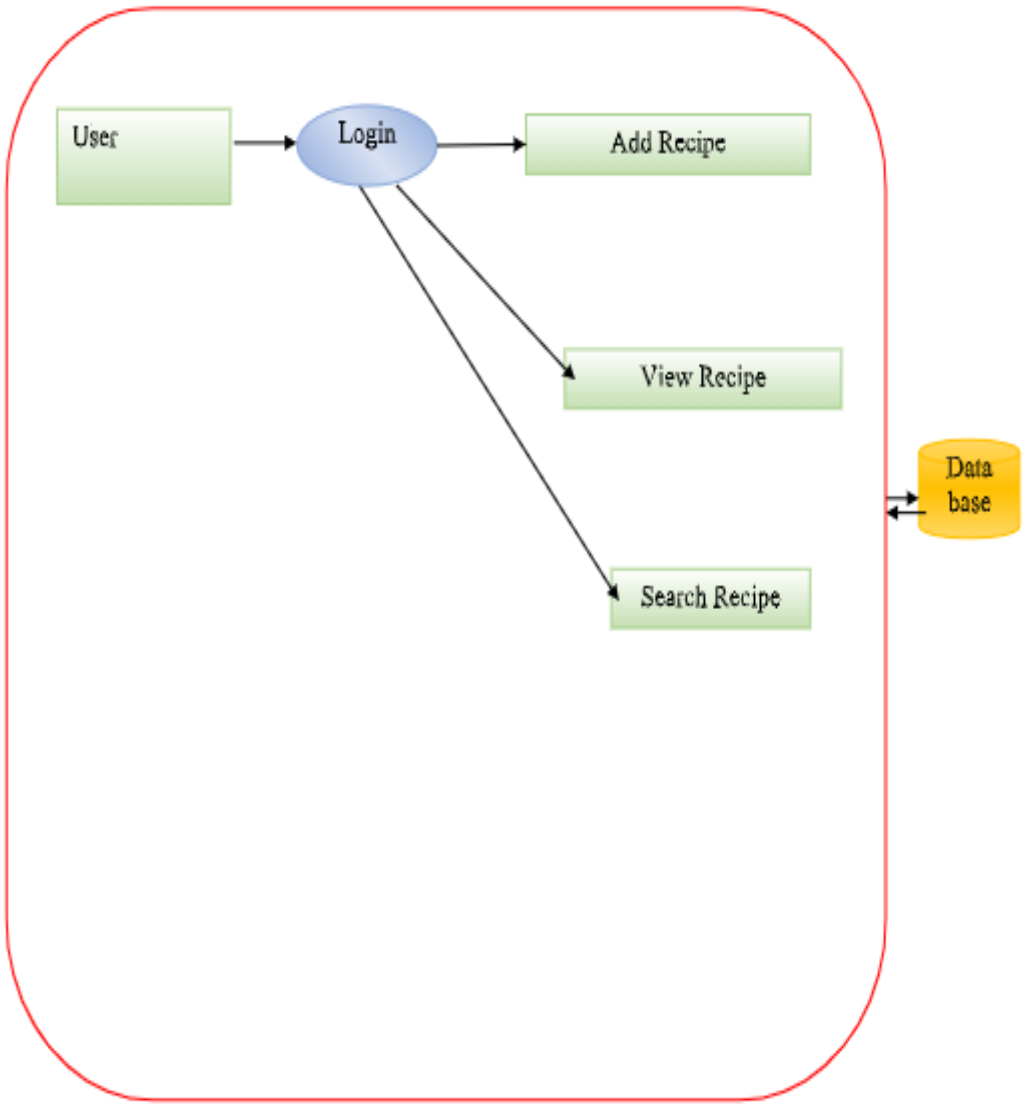

Fig1.1: System Architecture

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III. METHODOLOGY

Modules Name:
The system comprises of 3 major modules with their sub-modules as follows:
1) Create Recipe
2) View Recipe
3) Delete Recipe
Modules Explanation:

1. Create Recipe

In this module, users can add new recipes to the application's database. They can input key details, such as the recipe name, ingredients, preparation steps, cooking time, servings, calories, difficulty level, and an optional image. Users also have the flexibility to add new ingredients to the database and associate them with the newly created recipe. This module ensures that users can personalize and expand the recipe collection with their innovative ideas.

2. View Recipe

In this module, users can browse or search through the collection of available recipes. The application allows filtering and sorting recipes based on user preferences, such as available ingredients, preparation time, or dietary needs. Each recipe's details page provides comprehensive information, including preparation steps, nutritional content, and user ratings. Users can also mark recipes as favorites for easy access.

3. Delete Recipe

In this module, users can manage the recipe database by removing unwanted or outdated recipes. This functionality is accessible via the recipe details page or a dedicated management section. It helps maintain a curated and relevant collection of recipes for the user.

Implementation:

Requirements Gathering and Technology Stack Implementation:

To implement the app's requirements, focus on gathering clear user needs and selecting an appropriate technology stack to address these requirements. Start by identifying the functional needs, such as user authentication, recipe management, social sharing, and offline capabilities. Use Firebase for its robust authentication system, Firestore for real-time data storage, and Firebase Cloud Storage for images. The frontend is developed in Android (Java/Kotlin) using Android Studio. For enhanced UI/UX, tools like Figma are used to prototype the application. Social media sharing is enabled with SDKs like Facebook and Twitter SDKs, ensuring seamless integration for users to share recipes. Version control and team collaboration are managed via GitHub, while Postman facilitates API testing.

The technology stack ensures scalability and efficiency. Firebase's backend simplifies authentication, database, and storage needs, while Firestore ensures offline sync for saved recipes. Glide manages image loading efficiently, and Room Database supports offline caching. Tools like Retrofit handle API requests, while Android Studio offers the necessary environment for developing a responsive mobile app. This stack guarantees that the app is secure, user-friendly, and easily maintainable.

Application Architecture Implementation:

The app adopts the MVVM (Model-View-ViewModel) architecture to maintain modularity and separate concerns effectively. The Model layer handles data operations, including interactions with Firebase Firestore for recipes and Firebase Authentication for user management. It ensures offline support by leveraging Firestore's offline capabilities or using a Room Database for caching. The ViewModel acts as the mediator, fetching data from the Model and preparing it for the View while retaining UI-related data during configuration changes. It uses LiveData or StateFlow to notify the View of any data changes. The View layer, implemented as Android Activities or Fragments, is responsible for rendering UI components, such as RecyclerViews for recipe lists or forms for adding new recipes.

This architecture simplifies maintainability and testing. For instance, user authentication logic resides in the Model, while the ViewModel observes the authentication state and updates the UI accordingly. The separation ensures that UI changes do not disrupt business logic, making the app scalable and easier to debug as features grow.

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Algorithm Used

Recipe Search Algorithm

The Recipe Search Algorithm efficiently handles user queries for recipes based on keywords, filters, and preferences. Upon receiving the query, the algorithm initializes a search object with default values. It then performs a database query to locate recipes where the title partially matches the keywords or where the keywords are present in the list of ingredients. Additional filters, such as recipe type (e.g., vegan, quick meals) and preparation time, are applied to refine the results. The filtered recipes are sorted based on user preferences, such as ratings or cooking time, ensuring a personalized experience. The final list of recipes is returned to the user, ready to be displayed in a visually appealing RecyclerView.

This algorithm is highly customizable and scalable. By leveraging Firebase Firestore's querying capabilities, it provides real-time updates and supports complex filtering. Moreover, sorting based on dynamic user preferences enhances usability. Using an intuitive implementation approach, like pseudocode or modular functions, ensures maintainability and ease of extension, allowing future integration of additional filters or sorting criteria without major modifications.

Save Recipe as Favorite Algorithm

The Save Recipe as Favorite Algorithm manages user preferences effectively, allowing recipes to be saved for quick access. When a user selects a recipe to save, the algorithm retrieves the user's existing favorites from the database. It checks if the recipe is already present in the collection. If it exists, the system notifies the user that the recipe is already saved. Otherwise, the recipe ID is added to the user's favorites, and the updated collection is saved back to the database. A confirmation message is then returned to the user, confirming successful addition.

This algorithm ensures efficient management of user-specific data. By preventing duplicate entries, it optimizes storage and enhances user experience. The modular design of the algorithm makes it easy to integrate with Firebase Firestore or alternative backend solutions. Additionally, the user-specific data linkage allows for seamless personalization, ensuring favorites are readily available across devices.

Experimental Results

This project is developed using **Android Studio**, a comprehensive IDE designed specifically for Android app development. The frontend of the application is built using Android, employing **Java** and **Kotlin** as programming languages to create a visually appealing and responsive user interface that ensures smooth interaction. Key features like recipe search with advanced filtering options, user authentication, saving recipes as favorites, and social media sharing are seamlessly integrated to enhance the user experience. The frontend design follows modern Android UI guidelines to ensure usability and consistency across different devices.

The backend of the application is implemented in **Java**, which manages the core logic and facilitates communication with the database. By leveraging **Firebase** or **Firestore**, the app handles user data securely and efficiently while ensuring real-time synchronization for features like favorites and personal cookbooks. **Firebase Cloud Storage** supports storing and retrieving recipe images. The backend also enables functionalities like caching recipes for offline access and processing user-generated content, such as adding custom recipes. This architecture ensures the application is robust, scalable, and capable of handling dynamic user needs effectively.

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Home page:

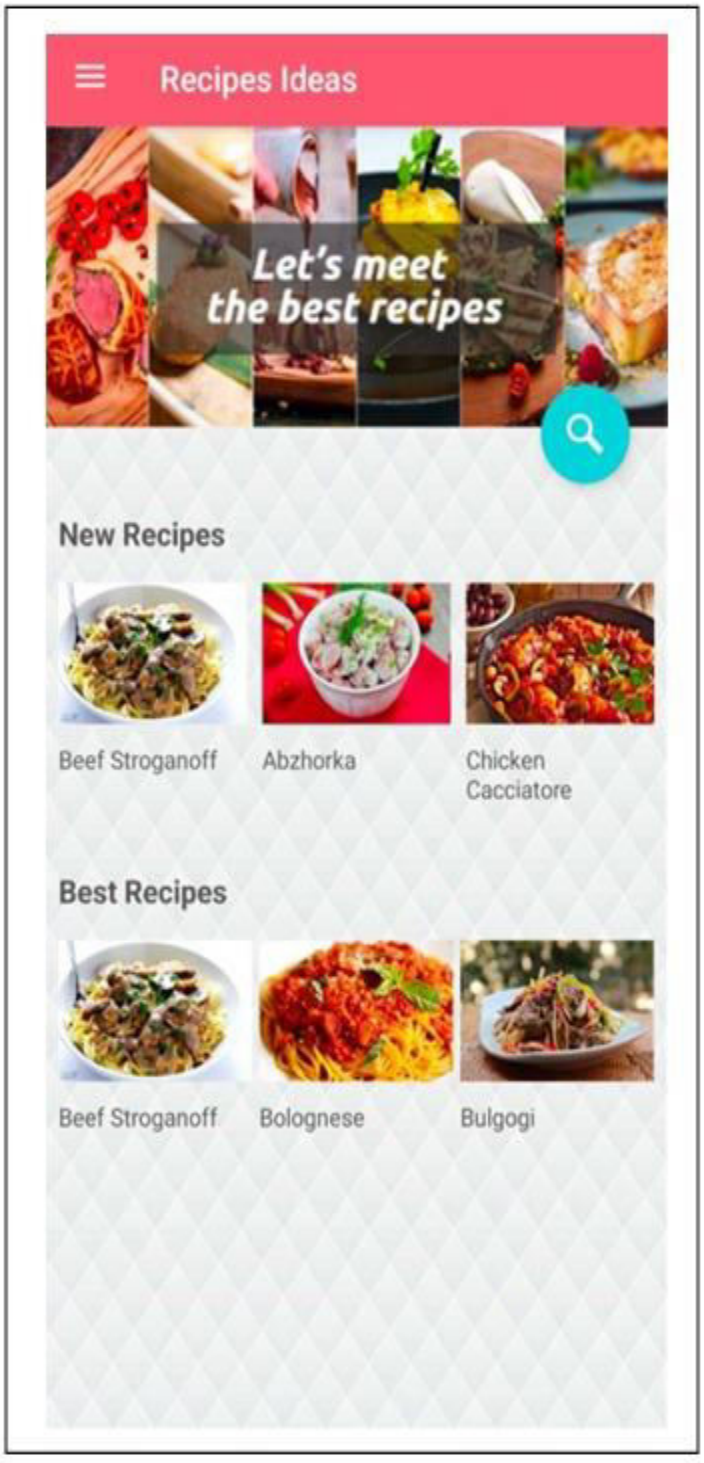

Fig: 2 Home Page

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Registration Page:

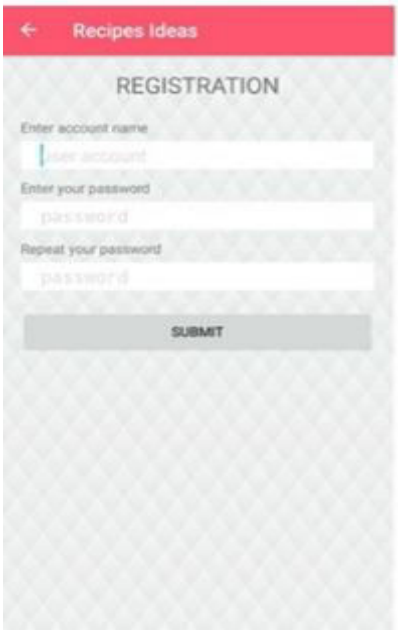

Fig: 3Registration Page

Login Page:

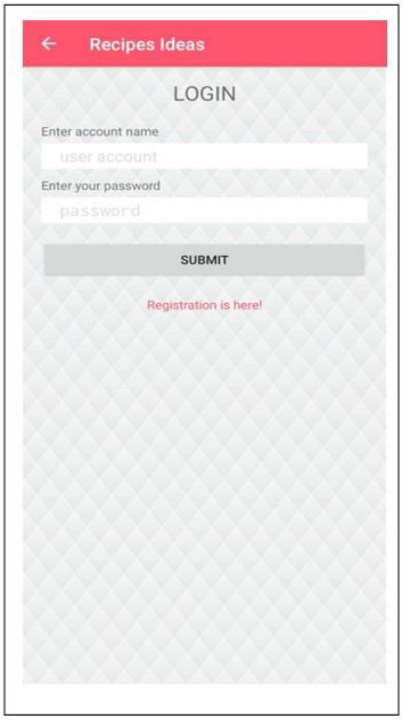

Fig: 4 login Page

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Add Ingredients Page:

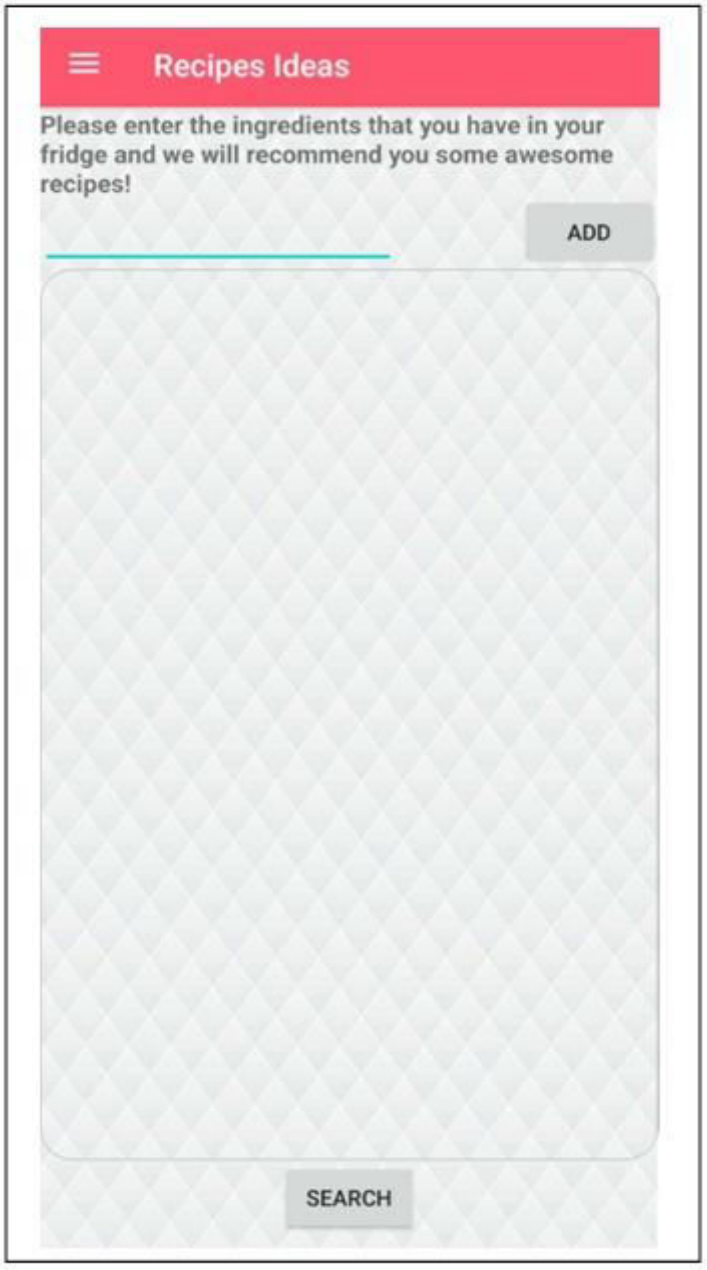

Fig: 5Add Ingredients Page

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Recipe page:

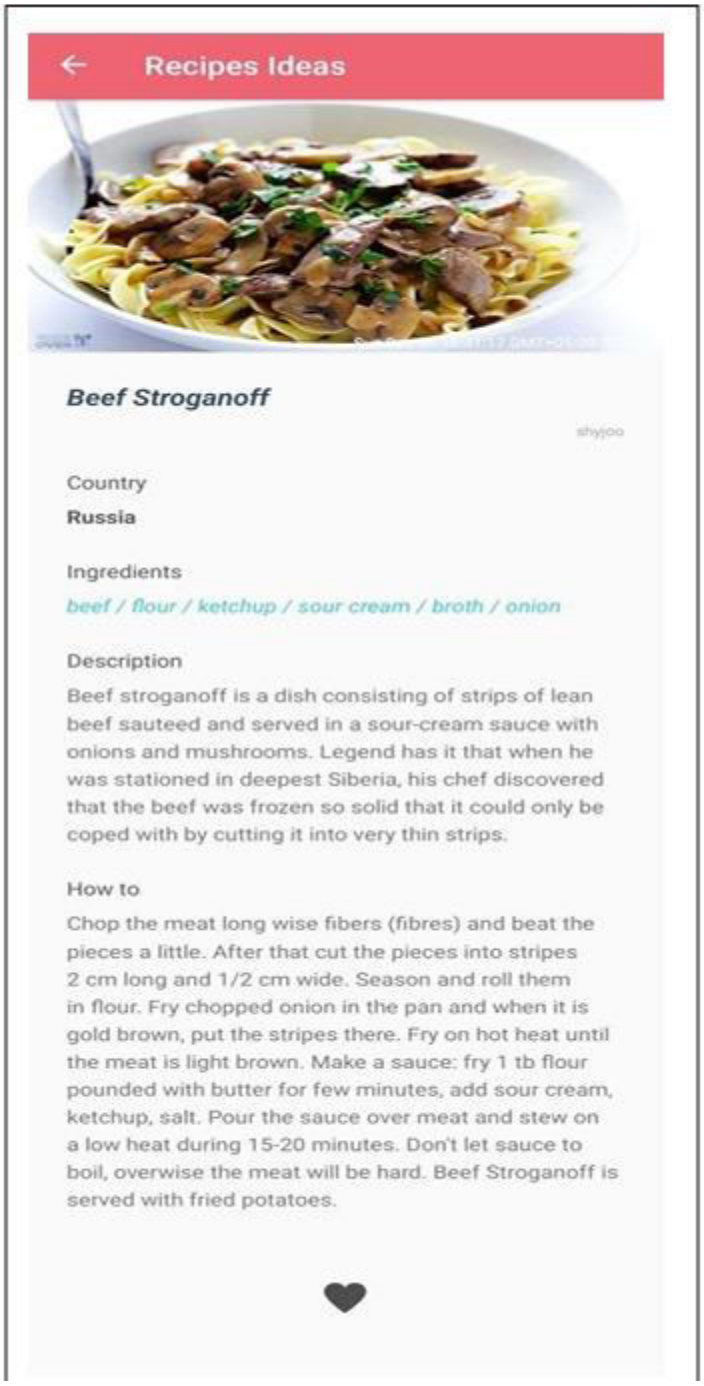

Fig: 6 Recipe Page

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IV. CONCLUSION

This application is extremely handy and useful for cooking a variety of recipes with minimum search effort from the internet. Internet recipes may appeal to one but not to another, some people like experimenting and trying their own recipe. This app also provides the ability to the user to create recipes and save it for later reference. It will help people to save their time and energy in finding recipes for daily routine as well as for special occasions. And since this is a mobile application, users have the luxury to check for recipes wherever they are and save them for later. The application can be used by a broad range of users which may include parents trying to cook new recipes for kids, people who are fond of desserts, restaurant owners trying to add new items to their menu and for regular cooking. It will help to make the lives of people simpler.

V. FUTURE ENHANCEMENT

This application provides an easy interface for users to search recipes from cloud, create their own recipe and share recipes. Food2Fork API is used for implementation and sources of recipes are limited. This application can be extended in many ways. The application can be extended to provide recipe from more other sources by integration other API like BigOven. Application has add to favorite and sharing capability for cloud recipes. The application can also be extended to include sharing capability for user created recipes in cookbook.

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