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## SMART CUISINE RECIPE FINDER

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**Abstract** -People get easily tired of eating the same things again and again. They then resort to restaurant/ junk food which affects their health as the vegetables and oil used by them are of suboptimal quality. The proposed system suggests recipes according to the fruits and vegetables available to the user. User scans the available fruits and vegetables and android application displays a list of possible recipes. The application is personalized, which means the recipes displayed are filtered according to the user's preferences and health conditions. For example, the proposed application does not display a spicy recipe to a user for elderly people. This makes our application more health friendly. It quickly displays a list of possible recipes. Another interesting aspect of the proposed project is using Machine Learning approach. Detection is one of the challenging and interesting problems in machine learning. This is done using Tensorflow ,which is free open source library.

**Keywords;** *Machine learning ;Tensorflow*

### I. INTRODUCTION

Food is one of the main human needs. Through food is the source of energy obtained. In its development food today is not only as a filler of energy needs, but more than that food has become an art and has added value. A wide variety of innovative creations in food have been developed and spread widely. Many of them use only the minimal amount of material to create an original recipe .A recipe consist of a set of instructions that tells us how to prepare and cook food, which include a list of what food is needed for . Cooking recipe consists of several aspects including: name, step, tools and materials, time and amount of dish.

Not everyone can memorize well the recipes they want. Their material is also an obstacle in cooking. Limited ingredients also become one of the causes of limited cooking creations, especially for someone who does not have passion in cooking. In the current era of gadget technology, innovations have been created to help people gather and search for the recipes they want, including a mobile-based apps that features to search for recipes based on the name desired by the user. However, there are often conditions where the user has only limited ingredients for cooking. While the applications that exist before it does not provide this feature. This is the situation where our solution comes into existence.

The proposed system is to build a mobile app that has a feature to search for recipes based on material owned by the user. The system suggests recipes according to the vegetables and fruits available to the user. User scans the available ingredients and android application displays a list of possible recipes online. The application is personalized, which means the recipes displayed are filtered according to the user's preferences and health conditions.

## II. LITERATURE REVIEW

[1] A cooking recipe recommendation system is demonstrated which runs on a consumer smartphone. Object recognition is carried out in a real-time way and recommends cooking recipes according to the recognized food ingredients. It points a built-in camera on a mobile device to food ingredients, thereby, the user could obtain recipe lists instantly. The main objective of the system is to assist people who cook to decide a cooking recipe at grocery stores or kitchen. The proposed system adopts object recognition of food ingredients.

[2] deals with a recipe recommendation method that is based on the user's food preferences. For extracting the user's food preferences, use his/her recipe browsing and cooking history. In the previous work, consideration was only existence of non-existence of each ingredient in the cooking recipe for extracting the preferences. In order to reflect the truly user's preferences, this paper propose a scoring method of cooking recipes based on user's food preferences and the quantity of the ingredient in a recipe. We are taking the method of recommending recipes truly based on user's preferences and available ingredients. Consequently, recipes are filtered according to user's preferences.

[3] proposes automatic systems for image recipe recognition. For this purpose, comparison and evaluation of vision-based and text-based technologies are carried out on a very large multimodal dataset (UPMCFood-101) which contains about 100,000 recipes for 101 food categories. Each item in this dataset is represented as one image plus corresponding textual informations. This paper propose a real application for daily users to identify recipes. This application is a web search engine that allows any mobile device to send a query image and retrieve the most relevant recipes in the dataset. Since there are many food data set available such as UPMCFood-101, we are using such food datasets for retrieving recipes based on the available ingredients.

[4] discuss about the automatic generation and recommendation of recipes based on outlier analysis. Research results on medicine and health show that people nowadays tend to have some common diseases due to abnormal eating habits, fast food cultures etc such as diabetes and high blood pressure. This paper is based on ontology dietary management. They are recommended to the user only if necessary nutrients are properly contained in the recipe. Outlier analysis is used to judge if a recipe is good or not. This paper proposes a new method based on machine learning. The recipes are generated based on existing ones using linear combinations. The proposed system adopts the method of recommending recipes based on user's health preferences. For example, the proposed application does not display a spicy recipe to an elderly person. This makes our application more health friendly.

[5] proposes ingredient recognition using deep based approach and retrieves the recipes for the estimation of nutrition facts necessary for various health relevant applications. Ingredient recognition and food categorization is done by exploiting the mutual and fuzzy relationship between them. It demonstrates the feasibility of ingredient recognition.

[6] proposes an integration of a deep neural network with a recommendation system. Only the interested ingredients are extracted from the user's favourite recipe. 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 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.

[7] discusses about displaying food image to cooking instructions conversion through compressed embeddings using deep learning. A unique method is proposed for obtaining the compressed embeddings of cooking instructions of a recipe image. For this cross model training of CNN, LSTM and Bi-Directional LSTM are used. From this paper, the proposed system adopts the method of automatic recipe recommendations and information retrieval system.

[8] recommends "easy" cooking recipes by analyzing the content of recipes and considering user's condition. The system learns user's preferences on cooking methods, food categories etc at any time when user's operate the system by observing the patterns of retrieving their interesting types of recipes. Whenever a user uses the system, the system

learns user's preferences on ingredients. The proposed system adopts such a recommendation system by taking the user's preferences into consideration.

### III. METHODOLOGY

Figure. 1 and figure. 2 illustrates the architecture of the proposed system. The user first registers with his/her personal details and the details of the user is stored in the database. The user can login into the app using the username and password provided by the user during registration procedure. The login page goes to next page where the user can add the available ingredients and the suitable recipe is displayed online according to the user's health preferences. If the user cannot identify a vegetable/fruit, he can scan it and identify the vegetable/fruit and display the recipe accordingly. A system architecture describes the organization of the system in terms of structure and behaviors by representing the different components and the relationship between them. The architecture of this system is composed of a mobile client that allows the application's users to make use of the different functionalities of the system. PHP interacts with the DBMS and manages the raw data of the system. In other words, the user of the app will get the input using an Android Client and send it to the server via HTTP. A PHP script on the server then invokes the server side application to do its work. Then, the result to be displayed is send back to the android device by the server. So, PHP and MySQL are responsible for retrieving the information from the server. Also, the architecture used in this app design shows that the HTTP protocol is used from the android system. So, in a nutshell, if we talk about the client-server architecture, client is the android device and in server-side there is a combination of PHP Script and MySQL.



Fig 1: System Architecture[9]

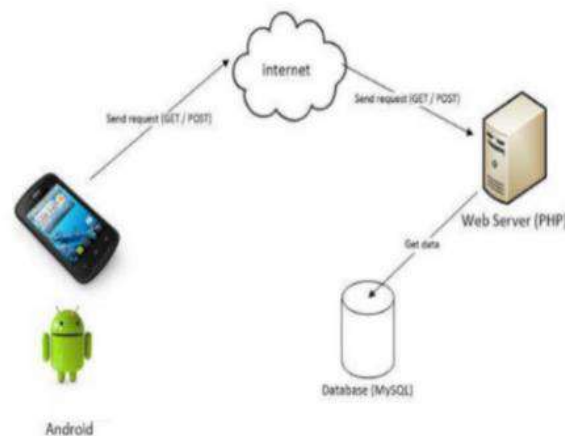


Fig 2: Architecture of the proposed system[9]

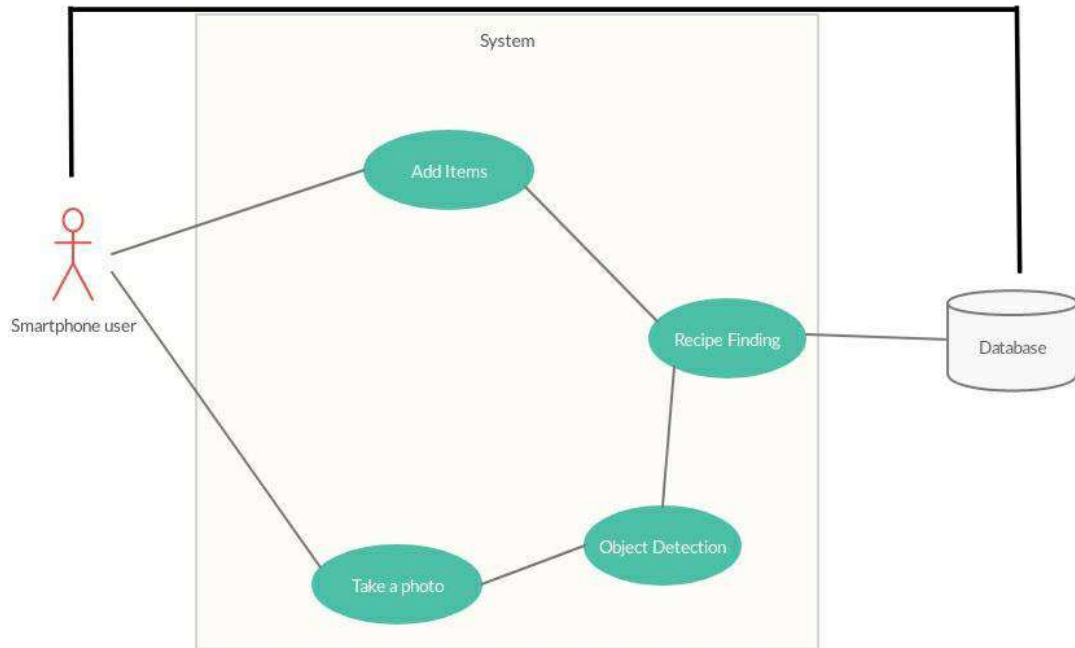


Fig 3 : Usecase diagram

Figure 3 illustrates the usecase diagram of the proposed system. The smartphone user could either add items (ingredients) or take a picture of the item to find the corresponding recipe. If the user adds the item, recipes could be directly obtained from the database else object detection method is done in order to find the recipe.

Project is divided into three modules which are:

- Login/Register
- Image Acquisition and Image Recognition
- Find Recipe

#### *Login/Register*

In this module the user first register with his/her personal details. If it is an already registered user, then it goes to the login module, where the user could give health preferences. Firstly, the user requests for registration. Then, the system checks in the database whether the user has already registered his details. A response is given to the user saying whether the request is accepted or rejected. If the response is given as rejected, it means the user is not a registered user. So, the user has to register it with his personal details. In case, if the response made was accepted, it indicates that the user is an already registered user. Then, it goes to the login module. A request is given for login and the user login with mobile number and password.

#### *Image Acquisition and Image Recognition*

In this module, the image of the vegetable or fruit is scanned using the user's smartphone. The scanned image is then pre-processed. The required object is extracted from the image. Next step is the vector identification of the extracted images using Tensorflow. The database consists of vector identification for identifying the vegetable/fruit. These vectors are compared with extracted image vector and the object is detected.



### Find Recipe

In this module, user can add and remove ingredients as of his/her needs and then the available ingredients are added to find the recipe. There are different options for selecting the ingredients for the recipes. One among them is the direct selection of the required ingredient in the page. Second option is taking the picture of the unknown vegetable or fruit. Then, that image is scanned and processed and then it is identified using Machine Learning approach. After the selection of all the ingredients, corresponding recipes are displayed. The recipes are filtered before displaying based on user's health preferences.

## IV.RESULT AND IMPLEMENTATION

User Interface of this app are shown in Fig.4. In this application, the main feature is object detection that is the image of the vegetable/fruit is detected and corresponding recipes are displayed.

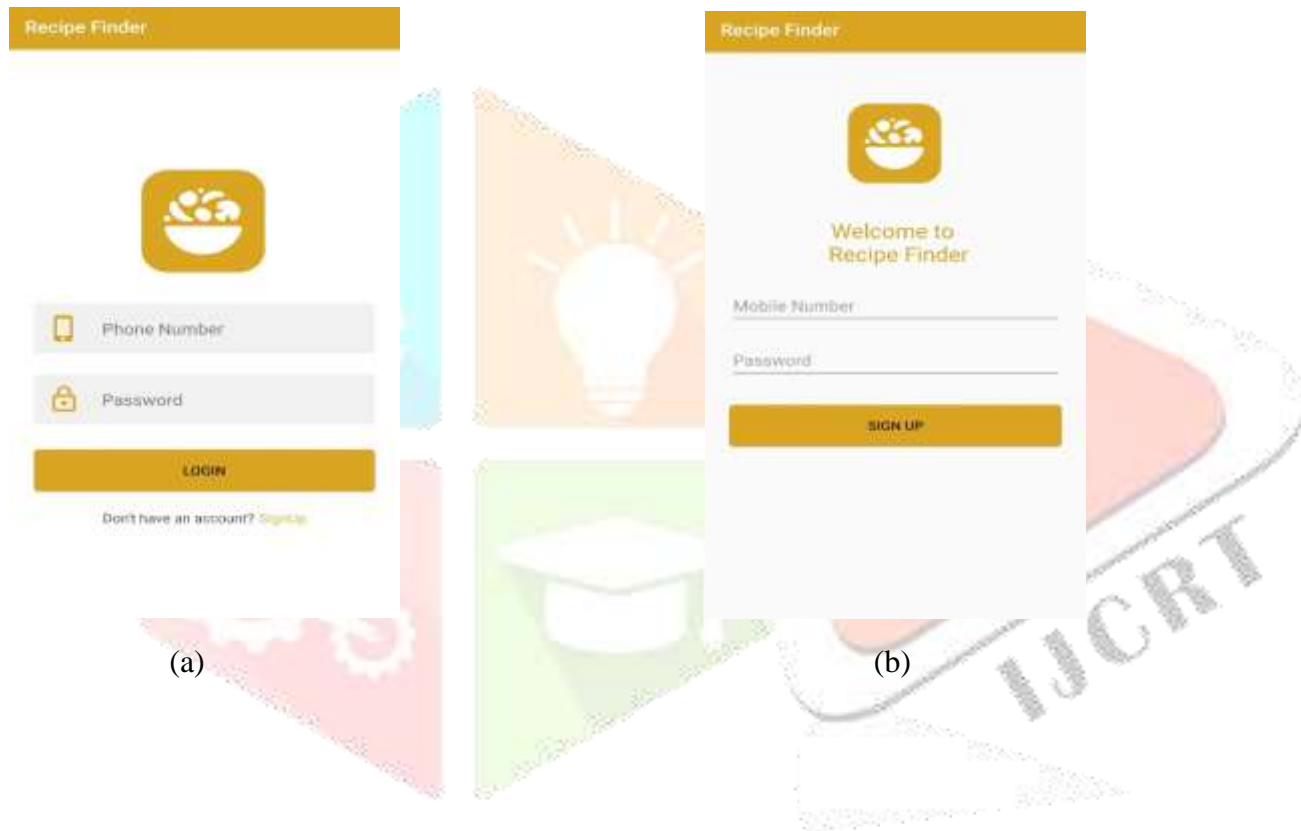




Fig 4 (a) Login page (b) Register page (c) Home page (d) Find recipe

Fig 5 shows the user survey and the user's assessment of the appropriateness and condition of the application.

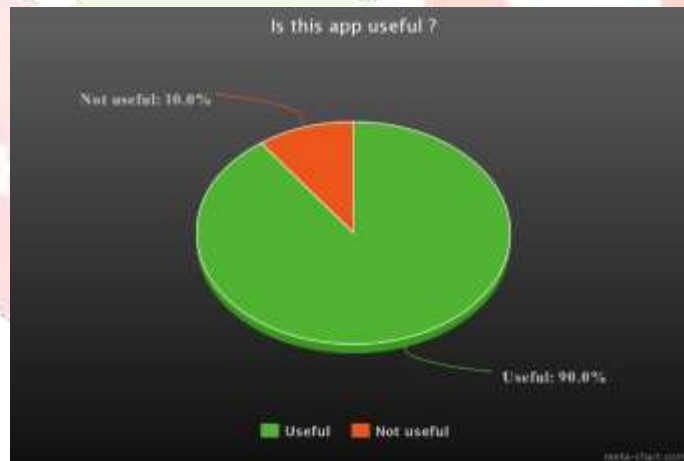


Fig 5 User survey

Table 1 shows the functional analysis of the application. From the usecase diagram, it can assume the application consist of three activity including login, register, image recognition and find recipe.

Table 1 Functional Analysis of the app

No.	Features	Status	Validator	User Agree
1	Login & Register	Work	User	90%
2.	Image Recognition	Work	User	85%
3.	Find Recipe	Work	User	80%

Regardless of the previous versions,our application has an additional feature of scanning the recipes using mobile camera which is more convenient to the users and it is completely agreed by themselves.

## V. CONCLUSION

Recipe application has a function to find recipes with ingredients that match what is owned by the user . This is a personalized app which is useful to those who don't know cooking. Users can find recipes either by selecting ingredients from the application or by using image processing method to scan the list of available ingredients to get the recipes accordingly. Based on users health preferences ,the recipes are filtered.

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