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The Solo Chef: Recipe Recommending Web Application Using Machine Learning

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ABSTRACT: There are millions of recipes which are uploaded on websites. But still, the user cannot find what dishes can be cooked by using the ingredients the user has. In such cases, the problem arises to find out recipes by the user himself with the current ingredients. This paper provides a simple but robust solution to this problem with personalized suggestions. A recommendation method is used in which the ingredients available by the user is taken as input and analysis process is done with the help of dataset collected, and the appropriate dishes or recipes are recommended to the user via Machine Learning.

KEYWORDS: Machine Learning, Recommendation, Ingredients, Recipes, Cosine Similarity.

I. INTRODUCTION

Food is one of the basic human needs. In its development, food today is not only a filler of energy needs, but more than that food has become an art and has added value. The Indian traditional cuisine has been extensively praised for its remarkable use of herbs and spices. The Indian food is famous for its great variety of dishes. The style of cooking differs from one area to another. India is well known for its broad diversity of fine food procurable in a wide range of eatery and hotel resorts, which recalls the unity in diversity. A recipe is a set of instructions telling you how to prepare and cook food, including 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.

The most common domestic issue raised by every chef at home is “What should I cook tonight or today?” To overcome these issues we are introducing “The Solo Chef: The Recipe Recommendation System”. Initially users have to register then users will be able to see an attractive home page. The home page also consists of “Search Recipe” and “Add Recipe”. In “Search Recipe” user can search recipe procedures by providing the recipe name. In “Add Recipe” user can add a new recipe. In home page the user will be able to input the available ingredients to obtain a suitable recipe. The home page also has a feature where it suggests certain recipes during several festivals. The suggestions are made using “Indian Recipe Dataset” which contains more than 6000 recipes in it.

II. LITERATURE SURVEY

Mayumi Ueda et al.[1] proposed user's food preference extraction for personalized cooking recipe recommendation. This paper extracts the user's favorite ingredients from the past search history. They have used the TF-IDF method for finding out the common repeating ingredients which they like the most by their search history and also they found the users disliked ingredients by recipe browsing or cooking history. The scores for cooking recipes with the estimation results regarding favorite/disliked ingredients and then provided recipes in decreasing order of their scores.

Anand Masurkar et al.[2] proposed Personalized Food Recipe Recommendation and Search. In this paper the author has proposed a personalized food recommendation where the application will recommend recipes based on the ingredients that you have, and it will save the recipes in your account. Author has discussed using Django Framework, PostgreSQL, Nginx and Celery. This system provides users the best experience and saves time and hassle to search for recipes of their interest. Ultimately, this brings users personalized experience and is useful to all.

Han Su et al.[3] proposed Automatic Recipe Cuisine Classification by Ingredients. The paper provides insights about which cuisines are the most similar and what are the essential ingredients for a cuisine, with an application to automatic

cuisine labeling for recipes. The paper aims to investigate the underlying cuisine ingredient connections by exploiting the classification techniques: associative classification and support vector machines. This study aims to investigate the underlying correlation between recipe cuisine and ingredients. The data provides insights on which cuisines are the most similar to each other and what are the common ingredients for each cuisine. This study and analysis can benefit some applications, such as automatic recipe cuisine labeling and cuisine-based recipe recommendation.

Gusti Pangestu et al.[4] proposed Food Recipe Finder Mobile Applications based on similarity of Materials. This study utilizes a smartphone app called “Recepiece” which has a function as a place to store and search for recipes based on materials owned by the user. By using several methods and approaches such as Euclidean distance and agile development program, this application is designed and developed based on mobile applications especially for android smartphones. It is a mobile app that has a feature to search for recipes based on material owned by the user.

Prof. Anuradha Deokar et al.[5] proposed insights about smart recipe- an innovative way to cook. In this paper, a system is made that carries out object recognition on food ingredients and recommends cooking recipes related to the recognized food ingredients. The objective of this paper is to discuss a general reference framework for the design of an urban IoT. To measure the quantity of ingredients required for cooking appropriately. To overcome the problem mainly faced on a daily basis on what food items can be made with available ingredients in the available quantity.

Suyash Maheshwari et al.[6] proposed Recipe Recommendation System using Machine Learning Models. In this paper the author has aimed to do two things that are Ingredient Pairing and Alternate Ingredient Recommendation. For this Tf-Idf and Cosine similarity are used. Alternative Ingredient recommendation is used to recommend an alternative ingredient if a particular ingredient is not present or cannot be used in the recipe. Word2vec model is used to find the similar ingredients and the most similar.

S. Praveen et al.[7] proposed insights about discovery of recipes based on ingredients using Machine Learning. A deep learning approach is focused on finding out the cuisine involved in a certain recipe through various ingredients used in it. A novel method is used to find out the best-suggested recipe through some available ingredients based on used in it. A recipe is suggested as well as a web link to view the recipe procedure. The appropriate dishes or recipes are recommended to the user by Machine Learning using K-Nearest Neighbors algorithm.

Aarti Nagarkar et al.[8] proposed Recommendation of Indian Cuisine Recipes based on Ingredients. The paper provides insights about past preferences of a user’s preferred dishes to recommend the new untested cuisines on the basis of recommendation of ingredients in the recipes already liked by the user. The paper has proposed the method to recommend the recipes of Indian cuisine on the basis of available ingredients and liked cuisine by using two techniques that are web scraping and content-based approach. The paper aims at helping users in decision making while searching for the most relevant recipe using ingredients they already have.

III. METHODOLOGY

A new user has to initially register to the web application to use its features. If the user has already registered, then user can directly login to the web application. If not, user has to register to the web application by filling the basic details like name, date of birth, email, password.

The technologies that have been used are:

1) Flask

Flask is a web framework. It is a Python module that lets you develop web applications easily. Flask is based on the Werkzeug WSGI toolkit WSGI toolkit and the Jinja2 template.

2) Firebase

Firebase is a platform developed by Google for creating mobile and web applications.

3) Python

Python is an interpreted high-level general-purpose programming language. Python has syntax that allows developers to write programs with fewer lines than some other programming languages. Python can be used on server to create web application.

4) Jinja2

Jinja2 is a popular template engine for Python. A web template system combines a template with a specific data source to render a dynamic web page.

IV. PROPOSED WORK

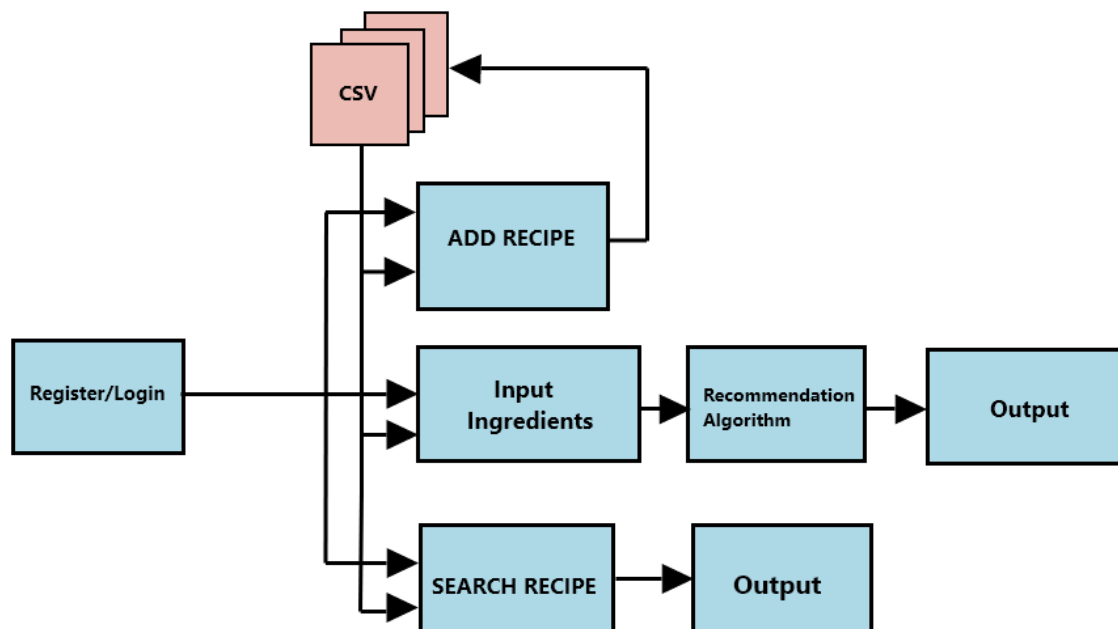


Figure 1:- Architectural Design

Figure 1 shows the architectural design of the recipe recommendation system. The following are the functionalities of the system:

- 1) User can register and login with username and password.
- 2) After successful login, user will be directed to the home page. The home page consists of add recipe, input ingredients and search recipe.
- 3) Add Recipe is used to add new recipe by the user.
- 4) Input Ingredients is for the user to enter ingredients available with them.
- 5) Search Recipe is used to search a particular recipe.
- 6) A recommendation algorithm provides a personal preference guide based on the user profile and preferences.

Recipe recommendation

The user has to first input ingredients available with them. Those ingredients are sent to the algorithm. In the algorithm, CountVectorizer is used for converting recipe ingredients into vectors. All the recipe ingredients from the dataset are used to train the model. Also, ingredients given by the user are used as test data. Then the similarity between both the vectors is found by using cosine similarity. Depending upon the similarity score and the main ingredients, recipes will be recommended to the user.

Search history

Based on the recipes recommended to the user in the past, the last five recipes will be stored in a queue. Any redundant recipe will not be stored in the queue. If the queue is full and a new recipe is found, the old recipe will be removed.

Search recipe

User can search for a particular recipe of his choice by providing the corresponding recipe name. The output of the search will have the recipe procedure along with the alternate ingredients if present.

Add recipe

If a user wants to contribute a new recipe which is not part of existing dataset then user can add the recipe by providing details such as recipe name, ingredients, preparation time, cooking time, servings, cuisine, course, diet, procedure and recipe image. The recipe details provided by the user will be cleansed and added to the recipe dataset. The recipe image provided by the user will be stored in firebase and URL of the image will be stored in recipe dataset.

V. RESULT AND ANALYSIS

The final project will result in recommending recipes to the user based on ingredients given. Cosine similarity is used for finding the similarity measure between recipe ingredients present in the dataset and ingredients that the user has given. The similarity score varies between 0 to 0.99. If the recipe recommended to the user consists of all the ingredients that the user has given, then the recommendation is specifically correct and the similarity score varies between 0.7 to 0.8. If the recipe recommended to the user may not contain all the ingredients that the user has given, then the recommendation is partially correct and the similarity score varies between 0.5 to 0.7. If the user inputs incorrect ingredients then the recommendation is not possible and the similarity score would be 0.0.

Figure 2 displays the home page of recipe recommending system where users can input ingredients to obtain recipes.

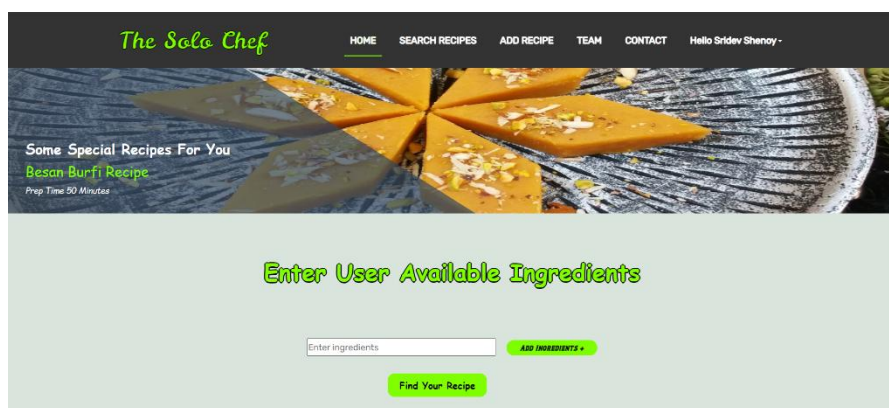


Figure 2:- Home page

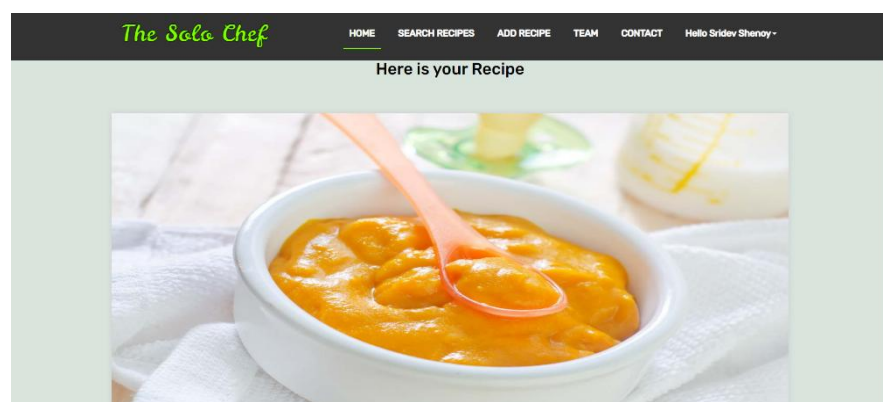


Figure 3:- Recommended recipe

Figure 3 and Figure 4 shows the image and description of the recommended recipe. Description includes Name, Ingredients, preparation time, cooking time, total time, servings, course, cuisine, diet and procedure.

**Figure 4:- Description of recipe**

VI. CONCLUSION

This paper aims at recommending recipes to user based on ingredients provided by them, then these ingredients are converted into vectors. Similarly, the ingredients present in the dataset will also be converted into vectors. Thus, by finding the similarities between both the vectors using cosine similarity necessary recipe recommendation is made. In addition to this, user can add new recipes and also the user can search the desired recipe by providing the recipe name, this search will now contain recipe procedure along with the alternate ingredients if present.

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