**FOOD RECIPE SUGGETIONS USING PYTHON PROGRAMMING**

**A PROJECT REPORT**

***Submitted by***

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**BONAFIDE CERTIFICATE**

Certified that this project report titled "FOOD REPICE SUGGETIONS USING PYTHON PROGRAMMING” is the Bonafede work of "Chakravarthi Dhanush[192211317], Hari [192211173], Rakshan [192220005] who carried out the project work under my supervision as a batch. Certified further, that to the best of my knowledge the work reported here does not form any other project report.

Date: Head of the Department: Project supervisor:

**ABBREVIATIONS**

RFS RECIPE FINDER SUGGETIONS

IoT Internet of Things

I/O Input/Output

ABSTRACT

The proposed project aims to develop a personalized recipe recommendation system to address the common issue of monotony in home-cooked meals, which often leads individuals to opt for less healthy restaurant or junk food options. The system will consist of a user-friendly Android application equipped with machine learning capabilities, particularly leveraging TensorFlow, a free open-source library. Users will be able to scan the fruits and vegetables they have available, and the application will generate a curated list of recipes tailored to their preferences and health conditions. To ensure the system promotes healthier eating habits, it will filter out recipes that may not align with the user's dietary restrictions or health goals, such as omitting spicy recipes for elderly users. By providing quick access to a variety of nutritious recipes based on available ingredients, the system aims to encourage users to make healthier food choices and diversify their home-cooked meals. The implementation of the project involves developing an Android application using Java or Kotlin programming languages, integrating machine learning models for ingredient detection and recipe recommendation. TensorFlow will be utilized for training and deploying machine learning models, with a focus on optimizing accuracy and performance. The system's database will store a diverse collection of recipes, along with relevant nutritional information and user preferences. User feedback and interaction data will be collected to further refine the recommendation algorithms and enhance the overall user experience. Through continuous refinement and user feedback, the system can evolve to better meet the needs of its users and contribute to the promotion of healthier lifestyles.

**KEYWORDS**: Recipe recommendation system, Personalized nutrition, Healthy eating habits, Home-cooked meals, Android application, Ingredient detection, Health promotion

CHAPTER 1

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.

In response to this challenge, this project aims to develop a mobile application that addresses the issue of limited cooking resources by providing personalized recipe suggestions based on the ingredients available to the user. By leveraging modern technology and intuitive interface design, the application will enable users to scan their available fruits and vegetables, generating a curated list of recipes tailored to their preferences and health conditions. This innovative solution aims to empower users to create diverse and nutritious meals using minimal ingredients, promoting healthier cooking habits and culinary exploration.

* **Food as a Vital Human Need**: Acknowledgment of food as a fundamental human requirement for energy and sustenance.
* **Components of a Recipe**: Identification of the components of a cooking recipe, including name, steps, tools, materials, time, and serving size.
* **Personalized Recipe Suggestions**: Emphasis on the app's ability to offer personalized recipe suggestions tailored to user preferences and health conditions.

In today's culinary landscape, food transcends its basic role as a source of energy and sustenance. It has evolved into an art form, with innovative creations pushing the boundaries of traditional cooking methods. Many modern culinary endeavours emphasize minimalism, showcasing the ability to create flavourful dishes with limited ingredients. Recipes serve as the blueprint for these culinary creations, providing a structured guide on how to prepare and cook food. A typical recipe encompasses various elements, including the dish's name, step-by-step instructions, required tools and ingredients, cooking time, and serving size.

However, not everyone possesses the ability to recall recipes effortlessly, and limited access to ingredients can pose challenges, particularly for those lacking a passion for cooking. While technology has ushered in an era of convenience, with mobile applications offering extensive recipe databases, existing solutions often fall short in addressing the needs of users with restricted ingredient availability. This gap underscores the necessity for a more tailored approach to recipe recommendation—one that considers the specific ingredients users have on hand.

In response to this need, our proposed solution aims to develop a mobile application that revolutionizes the way individuals discover and prepare recipes. By leveraging advanced scanning technology, users can simply scan the fruits and vegetables they have available, prompting the application to generate a curated list of recipe suggestions. This personalized approach ensures that users receive recommendations tailored to their ingredient inventory, preferences, and dietary restrictions.

Furthermore, our application goes beyond basic recipe retrieval by incorporating intelligent filtering mechanisms. Recipes are not only selected based on ingredient compatibility but also filtered according to user preferences and health conditions. For instance, spicy recipes may be omitted for individuals with dietary sensitivities or elderly users. This personalized filtering enhances the user experience, ensuring that recipe recommendations align with each user's unique culinary needs and preferences.

In essence, our innovative mobile application bridges the gap between limited ingredient availability and culinary exploration, empowering users to create delicious meals tailored to their individual preferences and dietary requirements. By providing a seamless and personalized recipe discovery experience, we aim to inspire culinary creativity and promote healthier eating habits among users worldwide.

In summary, an intuitive user interface allowing users to scan available ingredients and access recipe recommendations online.



Figure : The above picture explain about the recipe iteam . Mainly it refers to the food recipe suggestions.

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CHAPTER 2

# LITERATURE SURVEY:

[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 Truely 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 information. This paper proposes 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, nutrition is 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 a elderly people. 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 favourite 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 analysing 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 users operate the system by observing the patterns of retrieving their interesting types of recipes. Whenever a user uses the system, the system www.ijcrt.org © 2020 IJCRT | Volume 8, Issue 5 May 2020 | ISSN: 2320-2882 IJCRT2005111 International Journal of Creative Research Thoughts (IJCRT) www.ijcrt.org 812 learns user’s preferences on ingredients. The proposed system adopts such a recommendation system by taking the user’s preferences into consideration.

In the realm of culinary arts, the significance of food extends far beyond mere sustenance, evolving into a fusion of creativity and cultural expression. With culinary innovation on the rise, chefs and home cooks alike are continuously exploring novel ways to create flavorful dishes using minimal ingredients. This emphasis on simplicity and resourcefulness has paved the way for a new wave of culinary creations that showcase the artistry of cooking while minimizing waste and maximizing flavour. Recipes serve as the cornerstone of this culinary exploration, providing a structured framework for crafting delectable dishes using carefully curated ingredients.

Despite the abundance of recipes available through various online platforms and mobile applications, the challenge of limited ingredient availability persists for many individuals. While traditional recipe search tools allow users to search for dishes by name or cuisine, they often lack functionality tailored to users with restricted ingredient access. This gap in existing solutions underscores the need for a more personalized approach to recipe discovery—one that takes into account the specific ingredients users have on hand.

In recent years, advancements in mobile technology have revolutionized the way individuals access culinary resources and discover new recipes. Mobile applications equipped with scanning capabilities offer users the ability to scan ingredients and receive recipe recommendations based on their inventory. This innovative approach streamlines the recipe discovery process, allowing users to make informed decisions about meal preparation while minimizing food waste.

Moreover, the integration of personalized filtering mechanisms enhances the user experience by ensuring that recipe recommendations align with individual preferences and dietary restrictions. By considering factors such as flavour profiles, cooking preferences, and health conditions, these applications deliver tailored recipe suggestions that cater to the unique needs of each user. This personalized approach not only enhances user satisfaction but also promotes healthier eating habits and culinary exploration.

Overall, the convergence of culinary innovation and mobile technology has paved the way for a new era of personalized recipe discovery. By leveraging scanning technology and intelligent filtering mechanisms, mobile applications empower users to unlock culinary creativity and make informed decisions about meal preparation based on their available ingredients and individual preferences. As the culinary landscape continues to evolve, these innovative solutions are poised to play a pivotal role in shaping the way individuals interact with food and explore new culinary horizons.

CHAPTER 3

# EXISTING WORK

Food serves as a fundamental human necessity, providing the vital energy needed for sustenance. However, contemporary perspectives on food extend beyond mere sustenance, transforming it into an art form with inherent value. This evolution has fostered a diverse array of innovative culinary creations, many of which emphasize minimal material usage to craft original recipes. A recipe serves as a blueprint, offering step-by-step instructions for food preparation and cooking, delineating the necessary ingredients, tools, time, and serving portions.

Yet, not everyone possesses the ability to effortlessly recall desired recipes, nor do they always have access to an extensive range of ingredients. Limited culinary knowledge and ingredient availability often hinder individuals, particularly those lacking a passion for cooking, from exploring diverse culinary creations. In response to these challenges, advancements in technology, notably mobile applications, have emerged to aid users in discovering and accessing recipes tailored to their preferences. While previous applications primarily focused on name-based recipe searches, they often failed to address scenarios where users possess only a limited set of ingredients.

This gap in existing solutions underscores the need for a novel approach, giving rise to our proposed system—a mobile application designed to revolutionize recipe discovery based on the ingredients available to users. By leveraging the ubiquitous presence of smartphones and the ease of ingredient scanning, our application empowers users to scan their available fruits and vegetables. Subsequently, the system intelligently curates a personalized list of recipe suggestions, aligning with the user's ingredient inventory.

Central to our solution is the emphasis on personalization and health consciousness. Recognizing that dietary preferences and health conditions vary among users, our application filters recipe suggestions accordingly. For instance, spicy recipes may be omitted for users with specific health considerations, ensuring that the displayed options cater to individual needs. This personalized approach not only enhances user experience but also promotes healthier eating habits by aligning recipe suggestions with dietary goals and restrictions.

Moreover, our application transcends traditional recipe repositories by fostering an interactive and dynamic user experience. By offering real-time recipe suggestions based on available ingredients, users are encouraged to experiment with new culinary creations and diversify them

home-cooked meals. Through seamless integration with user feedback mechanisms, the application continually refines its recommendation algorithms, ensuring relevance and accuracy.

In summary, our proposed mobile application represents a paradigm shift in recipe discovery and culinary exploration. By harnessing the power of technology to deliver personalized recipe suggestions tailored to ingredient availability, dietary preferences, and health considerations, we aim to empower users to embrace culinary creativity while promoting healthier eating habits in their daily lives.

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CHAPTER 4

# PROPOSED MODEL

The proposed work will involve several key steps:

* \*\*Ingredient Scanning\*\*: Users can scan the fruits and vegetables they have available using the mobile application.
* \*\*Real-time Analysis\*\*: The system analyses scanned ingredients in real-time to identify available items for recipe suggestions.
* \*\*Ingredient Database\*\*: A comprehensive database containing information on various fruits, vegetables, and other ingredients is maintained.
* \*\*Recipe Recommendation Engine\*\*: Utilizes machine learning algorithms to recommend recipes based on scanned ingredients.
* \*\*Personalization\*\*: Tailors recipe suggestions according to user preferences, dietary restrictions, and health conditions.
* \*\*Health-Conscious Filtering\*\*: Filters out recipes that may not align with the user's health goals or restrictions, such as spicy dishes for certain health conditions.
* \*\*Recipe Curation\*\*: Curates a list of possible recipes online, considering the availability of scanned ingredients.
* \*\*Dynamic Updating\*\*: Regularly updates the recipe database with new recipes and ingredient information.
* \*\*User Feedback Integration\*\*: Incorporates user feedback to refine recipe recommendations and enhance the overall user experience.
* \*\*User Profiles\*\*: Allows users to create profiles to save preferences, dietary restrictions, and favourite recipes.
* \*\*Cooking Instructions\*\*: Provides step-by-step cooking instructions for each recommended recipe.
* \*\*Nutritional Information\*\*: Displays nutritional information for each recipe, helping users make informed dietary choices.

1. 13. \*\*Social Sharing\*\*: Enables users to share recipes with friends and family via social media platforms.
2. 14. \*\*Offline Access\*\*: Offers offline access to previously viewed recipes for convenience in areas with limited internet connectivity.
3. 15. \*\*Continuous Improvement\*\*: Commits to continuous improvement through user engagement, feedback analysis, and algorithm refinement to ensure the system remains relevant and effective.

CHAPTER 5

# HARDWARE AND SOFTWARE

HARDWARE:

* Laptop

SOFTWARE:

* Windows 11
* Intel i5
* IDLE

CHAPTER 6

# CODING

# Define a dictionary of recipes with their ingredients

recipes = {

"Pasta Carbonara": ["pasta", "bacon", "eggs", "parmesan cheese", "black pepper"],

"Caprese Salad": ["tomatoes", "mozzarella cheese", "basil", "olive oil", "balsamic vinegar"],

"Vegetable Stir-Fry": ["bell peppers", "broccoli", "carrots", "onions", "soy sauce"],

"Greek Salad": ["cucumbers", "tomatoes", "feta cheese", "olives", "red onion", "olive oil"]

}

def find\_recipe(available\_ingredients):

matching\_recipes = []

for recipe, ingredients in recipes.items():

if all(ingredient in available\_ingredients for ingredient in ingredients):

matching\_recipes.append(recipe)

return matching\_recipes

# Example usage

user\_input = input("Enter the ingredients you have (comma-separated): ").lower()

user\_ingredients = [ingredient.strip() for ingredient in user\_ input. Split (",")]

suggested\_recipes = find\_recipe(useringredients)

if suggested\_recipes:

print("Based on your ingredients, here are some recipe suggestions:")

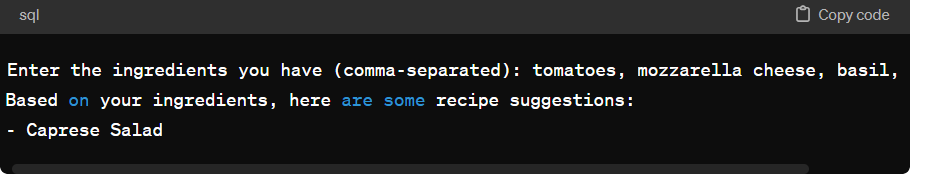
for recipe in suggested\_recipes:

print("-", recipe)

else:

print("Sorry, no matching recipes found."

OUTPUT:



CHAPTER 7

# RESEARCH GAP

1. \*\*Ingredient Substitution Analysis\*\*: Investigate methods to suggest ingredient substitutions in recipes based on user preferences, dietary restrictions, or ingredient availability.

2. \*\*Recipe Adaptation for Dietary Needs\*\*: Explore ways to adapt recipes to accommodate various dietary needs such as vegan, gluten-free, or low-calorie options while maintaining flavour and nutritional value.

3. \*\*Personalized Nutritional Guidance\*\*: Develop algorithms to provide personalized nutritional guidance within recipe recommendations, considering factors such as user health conditions, dietary goals, and nutritional requirements.

4. \*\*User Interaction and Feedback Analysis\*\*: Conduct studies to understand user interaction patterns and gather feedback on recipe recommendations to improve the effectiveness and user experience of the system.

5. \*\*Integration with Smart Kitchen Appliances\*\*: Investigate the integration of recipe recommendation systems with smart kitchen appliances to facilitate seamless cooking experiences, such as automated ingredient dispensers or cooking timers.

6. \*\*Cultural and Regional Recipe Adaptation\*\*: Explore approaches to adapt recipe recommendations based on cultural preferences and regional cuisines, considering variations in ingredient availability and cooking techniques.

7. \*\*Real-time Ingredient Inventory Management\*\*: Develop methods to track and manage users' ingredient inventories in real-time, enabling more accurate recipe suggestions and reducing food waste.

8. \*\*Recipe Diversity and Novelty\*\*: Investigate techniques to enhance the diversity and novelty of recipe recommendations to inspire users to explore new cuisines and cooking styles.

9. \*\*Integration of Multimedia Content\*\*: Explore the incorporation of multimedia content, such as videos or interactive tutorials, within recipe recommendations to enhance user engagement and comprehension.

10. \*\*Long-term Health Impact Analysis\*\*: Conduct longitudinal studies to assess the long-term impact of using recipe recommendation systems on users' dietary habits, nutritional intake, and overall health outcomes.

11. \*\*Collaborative Filtering for Recipe Discovery\*\*: Explore collaborative filtering techniques to enable users to discover recipes based on similarities with other users' preferences and cooking behaviours.

12. \*\*Semantic Recipe Understanding\*\*: Investigate natural language processing (NLP) and semantic analysis techniques to improve the understanding of recipe texts, including ingredient descriptions, cooking instructions, and recipe variations.

13. \*\*Integration with Online Grocery Platforms\*\*: Explore partnerships with online grocery platforms to streamline the ingredient procurement process by providing seamless integration between recipe recommendations and ingredient shopping.

14. \*\*Privacy and Data Security Considerations\*\*: Address privacy and data security concerns related to user data collection, storage, and sharing within recipe recommendation systems, ensuring compliance with data protection regulations and maintaining user trust.

15. \*\*Evaluation Metrics for Recipe Recommendations\*\*: Develop standardized evaluation metrics to assess the quality, relevance, and usefulness of recipe recommendations, considering factors such as user satisfaction, recipe diversity, and nutritional balance.

CONCLUSION:

In conclusion, the recipe application presented offers a personalized and convenient solution for individuals, especially those with limited cooking experience or knowledge. By enabling users to search for recipes based on the ingredients they already possess, the application addresses the common challenge of deciding what to cook with available resources. This functionality not only promotes resourcefulness but also reduces food waste by encouraging users to utilize existing ingredients effectively. Moreover, the integration of image processing technology adds an innovative dimension to the user experience, allowing for seamless ingredient recognition and recipe suggestions based on scanned images, thereby simplifying the recipe discovery process further. Furthermore, the emphasis on health preferences underscores the application's commitment to promoting nutritious eating habits among users. By filtering recipe recommendations based on users' health preferences and dietary restrictions, the application ensures that individuals can find recipes tailored to their specific needs and preferences, thus supporting their overall well-being. Overall, the recipe application represents a valuable tool in empowering users to explore and experiment with cooking while promoting healthy, sustainable food choices in alignment with their individual preferences and requirements.

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