RECIPE RECOMMANDATION SYSTEM

PRESENTED BY

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OUTLINE

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- **Proposed System/Solution**
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PROBLEM STATEMENT

- In the age of information overload and growing culinary interest, users often struggle to decide **what to cook** based on their **available ingredients, dietary preferences, health constraints**, or **taste profiles**. With millions of recipes available online, users are overwhelmed with choices, making it difficult to discover meals that match their current needs, time constraints, or nutritional goals.
- Traditional search engines or recipe platforms require manual filtering and do not adapt to user preferences over time. Furthermore, they rarely consider important personalization factors like allergies, calorie limits, or cultural cuisines.
- Thus, there is a pressing need for an **intelligent recipe recommendation system** that can:
- Suggest recipes based on **user input** (ingredients, time, preferences)
- Personalize recommendations using **machine learning or AI**
- Offer alternatives based on **dietary needs** (e.g., vegan, gluten-free, keto)
- Learn from user feedback and evolve with usage
- This project aims to develop a **smart, AI-driven recipe recommendation system** that enhances the cooking experience by providing users with **relevant, healthy, and personalized recipe suggestions**, helping them make better culinary decisions with minimal.

PROPOSED SOLUTION

- The existing systems for recipe recommendation are mostly limited in functionality and personalization. Many popular cooking platforms and mobile apps provide basic search options based on recipe names, categories, or filters like cuisine type, cooking time, or dietary preference. However, these systems often lack the ability to intelligently process user inputs such as a list of available ingredients or specific tags. Most rely on keyword-based or rule-based matching, which can return irrelevant or overly broad results. While some platforms have started to adopt content-based filtering techniques, the use of advanced Natural Language Processing (NLP) and similarity measures is still not widespread. Furthermore, existing systems typically do not allow for dynamic, ingredient-specific recommendations or personalized suggestions without extensive user data. This highlights the need for a more intelligent, flexible, and accessible solution—one that leverages modern NLP and machine learning techniques to provide accurate, relevant, and user-friendly recipe recommendations based on both ingredients and descriptive

SYSTEM APPROACH

SOFTWARE REQUIREMENTS:

1.operating system

2.MySQL

3.Libraries,Frames

4.Python

HARDWARE REQUIREMENTS:

1.CPU

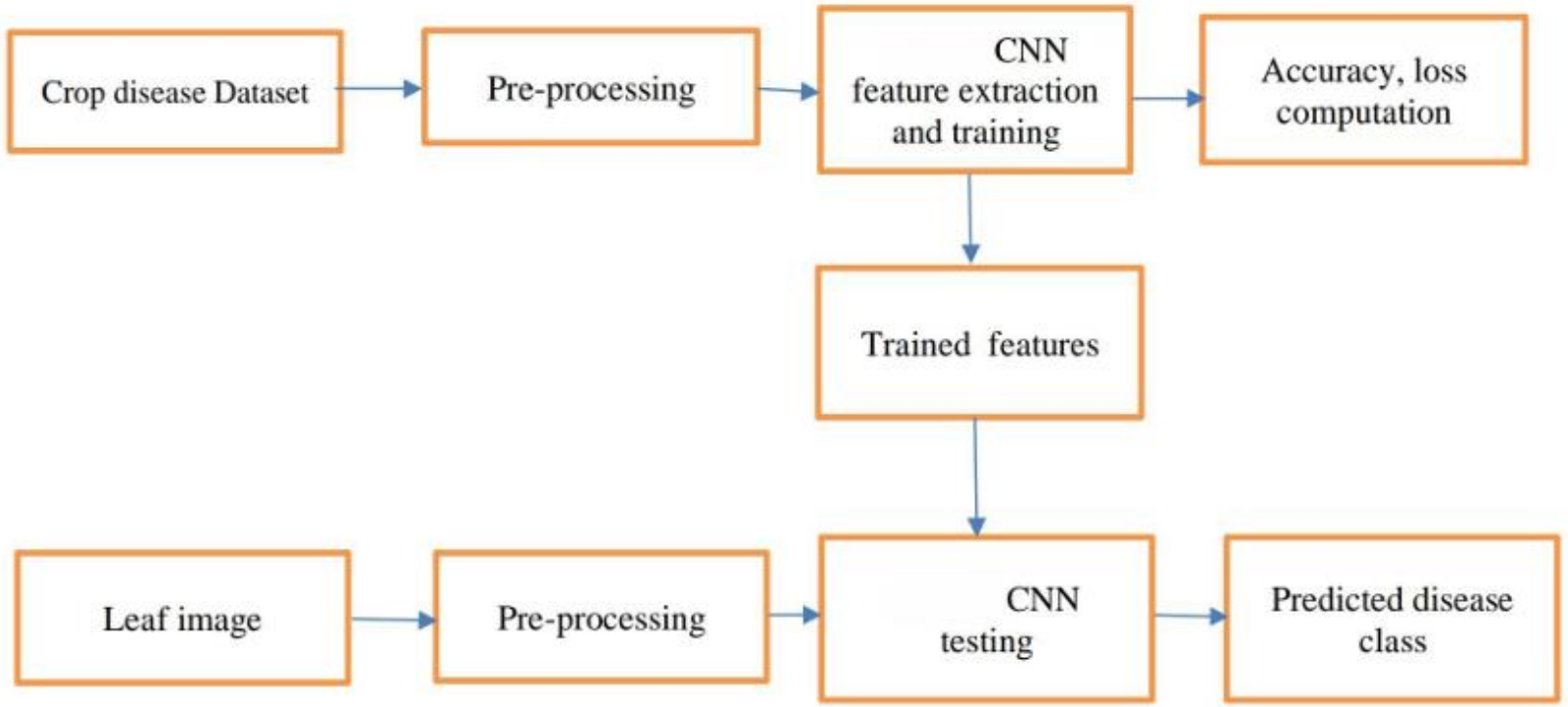
2.Ram

3.GPU

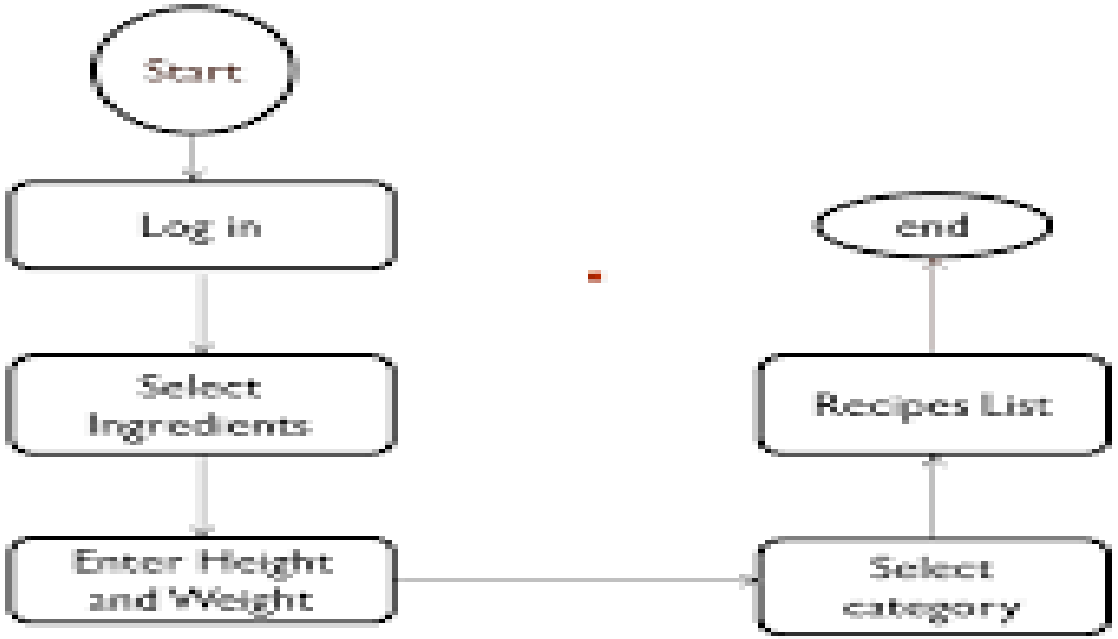
LIBRARIES USED:

- **Tensorflow:** TensorFlow is a free across a range of tasks. and open-source software library for dataflow and differentiable programming
- **Numpy:** Numpy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays.
- **Matplotlib:** Matplotlib is a Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. Version 3.1.3 is installed.
- **Scikit – learn:** Scikit-learn provides a range of supervised and unsupervised learning algorithms via a consistent interface in Python. Version 0.22.2.post1 is installed

BLOCK DIAGRAM



COMPONENTS


Start
Log in
Select Ingredients
Enter Height and Weight
Select category
Recipes List
end

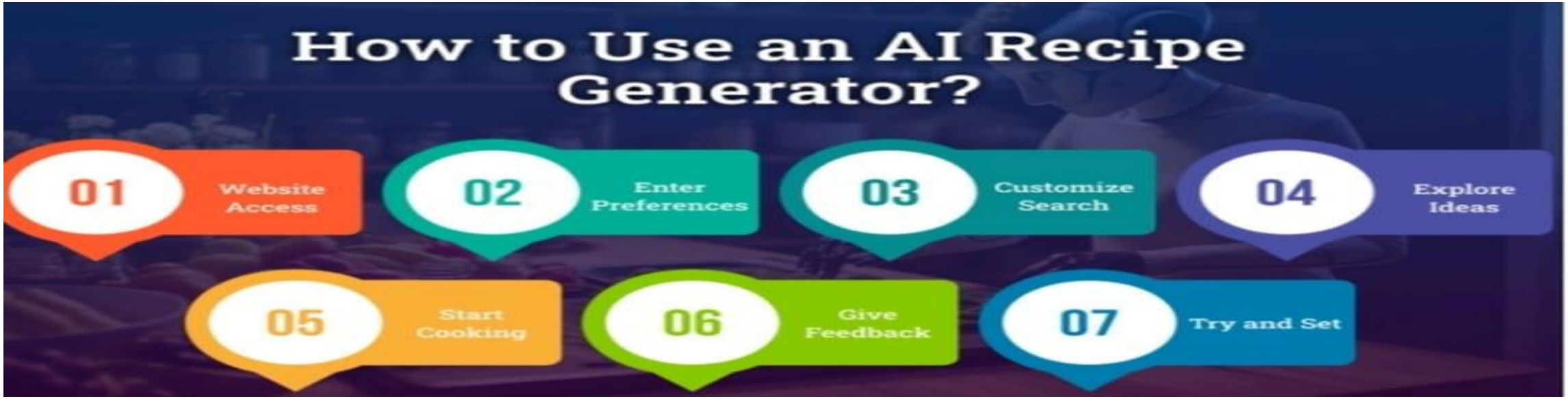
ALGORITHM & DEPLOYMENT

Algorithm Used:

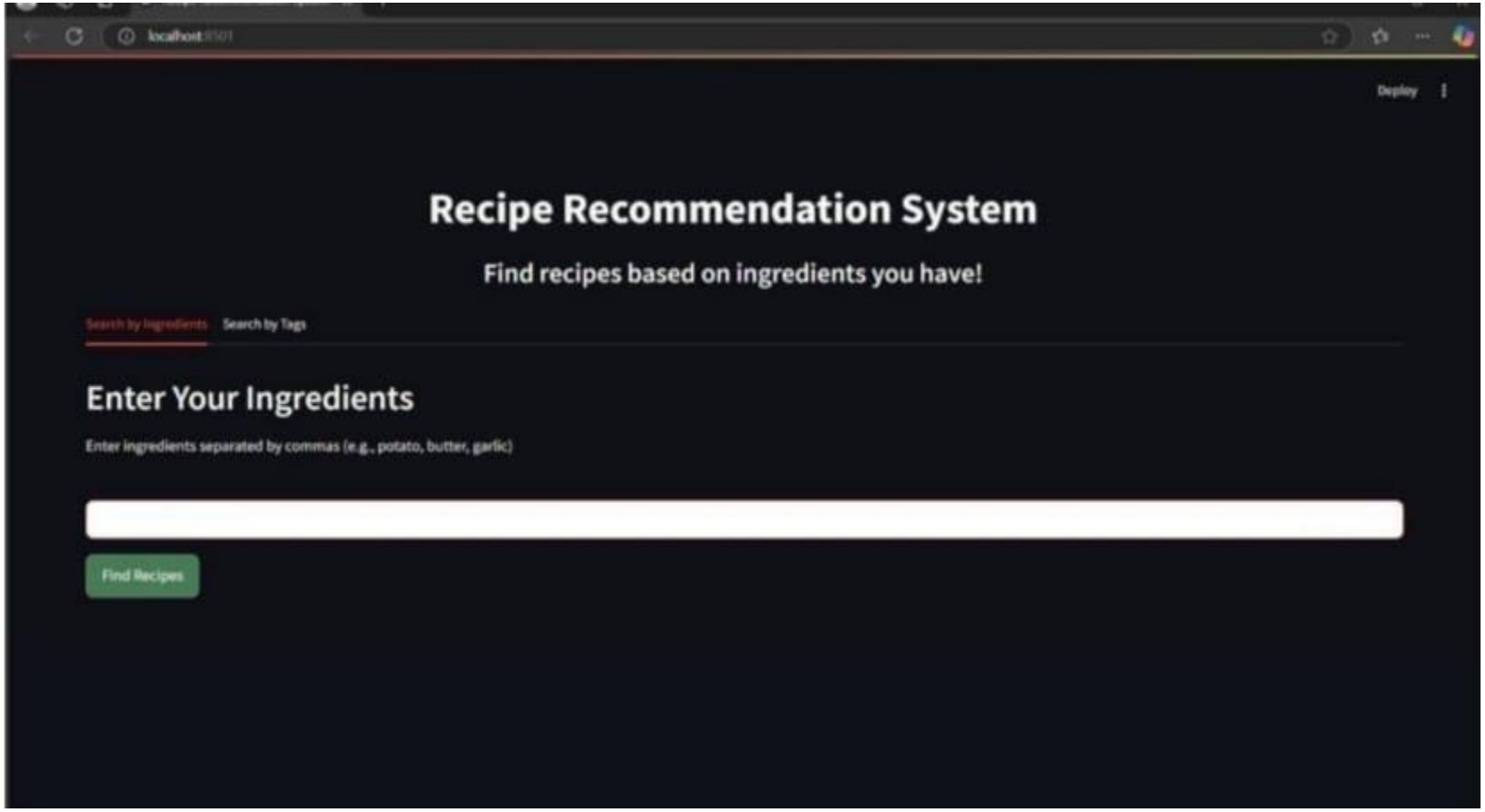
- NLPTechniques Used:
- CountVectorizer – Convertsingredient text into numerical vectors forsimilarity
- comparison.
- TF-IDF (Term Frequency-Inverse Document Frequency) – Highlights unique
- ingredients by reducing the impact of very common ones.
- Tokenization – Splits text into individual words or tokens (e.g., "1 cup sugar" → ["1",
- "cup", "sugar"]).
- Stop Word Removal – Removes common words (like "and", "with") to focus on
- important terms.
- Stemming/Lemmatization – Reduces wordsto their base form (e.g., “chopped” →
- “chop”).

Working:

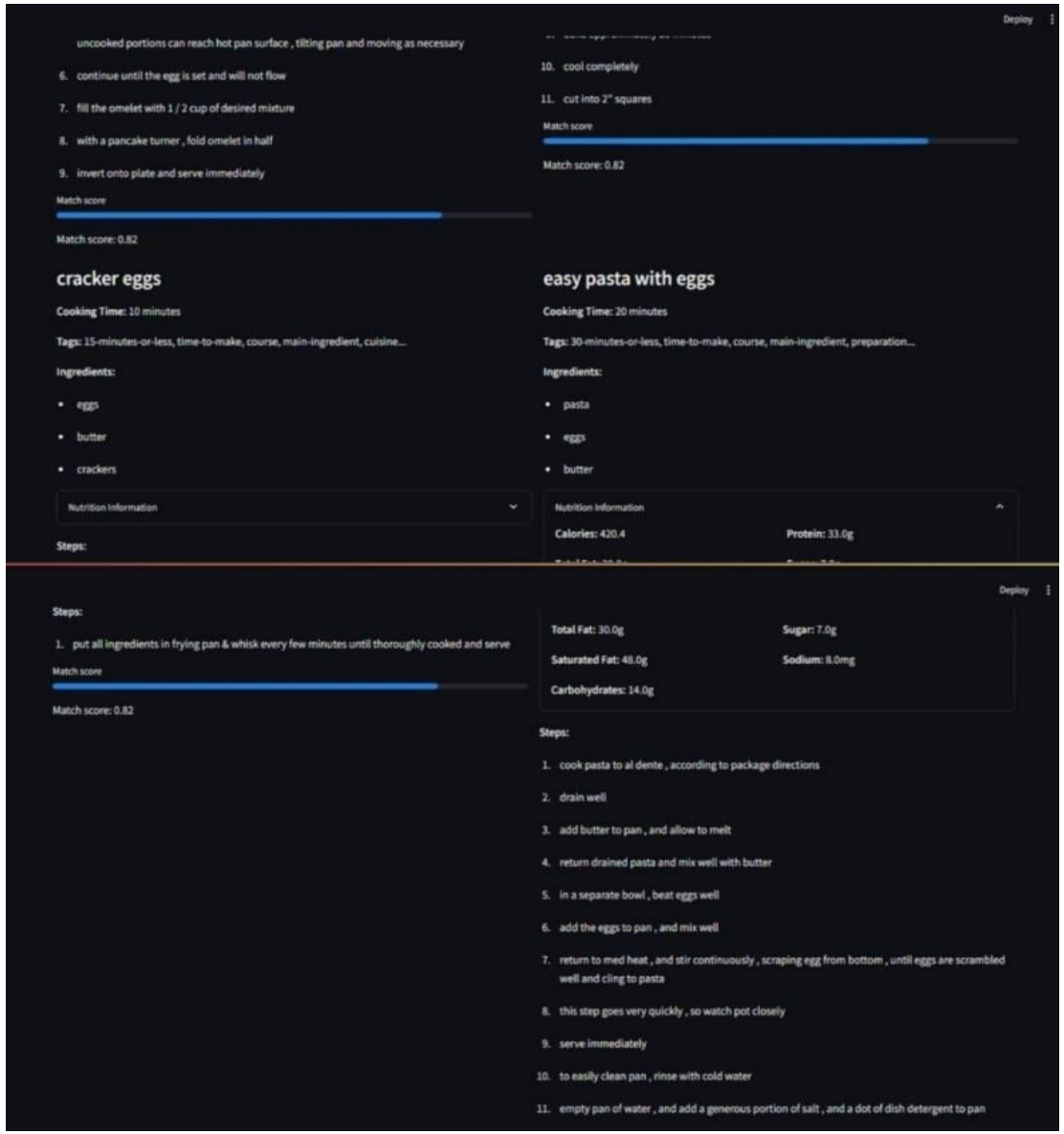
- User Input Collection – Users provide available ingredients, cuisine preference, and dietary restrictions.
- Data Processing & Feature Extraction – The system analyzes recipes, ingredient compatibility, and cooking techniques using NLP.
- Machine Learning Model Processing – A deep learning model (LSTM/Transformer) generates personalized recipes based on input.
- Recipe Generation & Display – AI suggests recipes with ingredients, step-by-step instructions, and nutritional details.
- Feedback & Improvement – User feedback helps refine recipe suggestions and improve model accuracy over time.

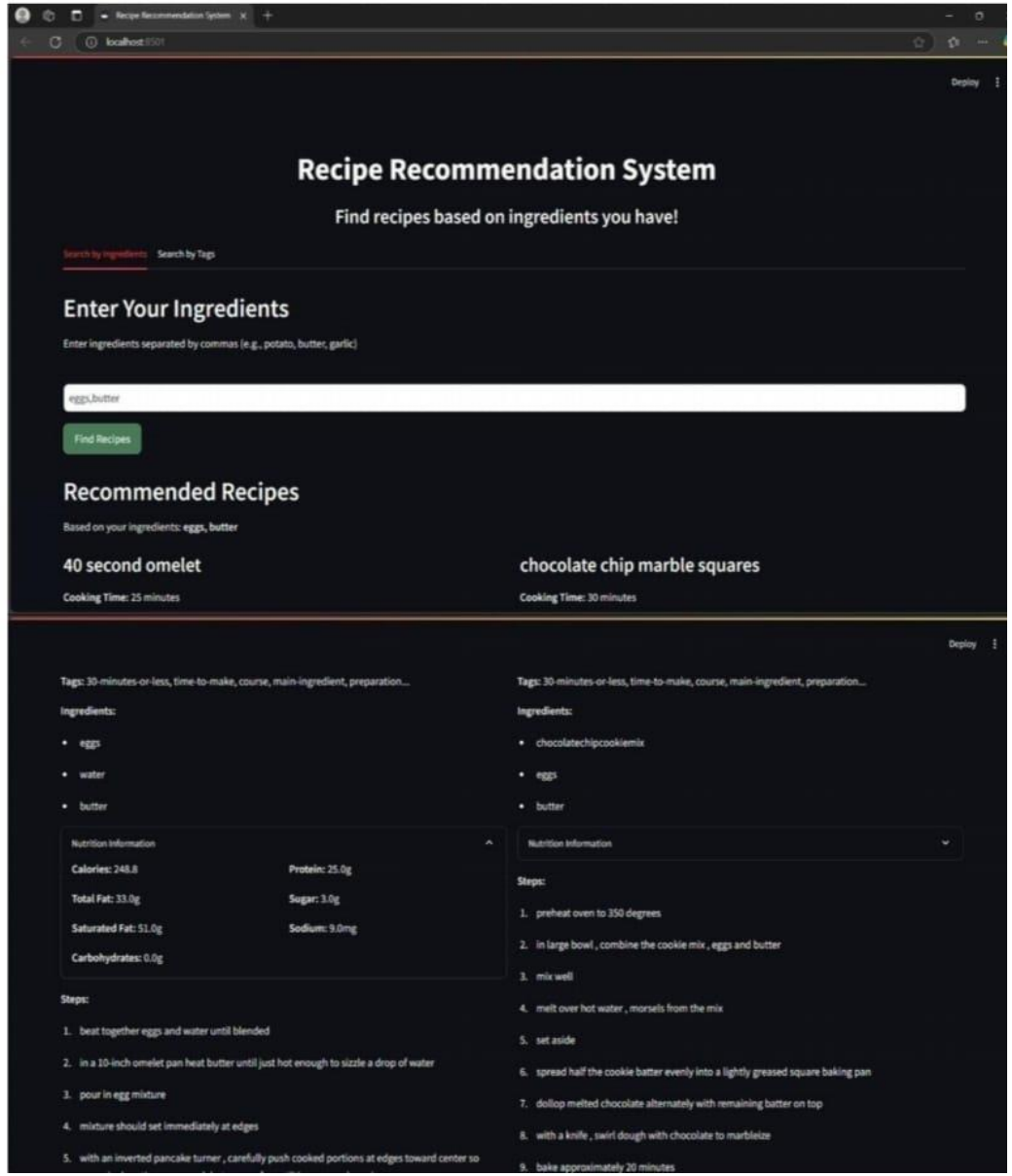


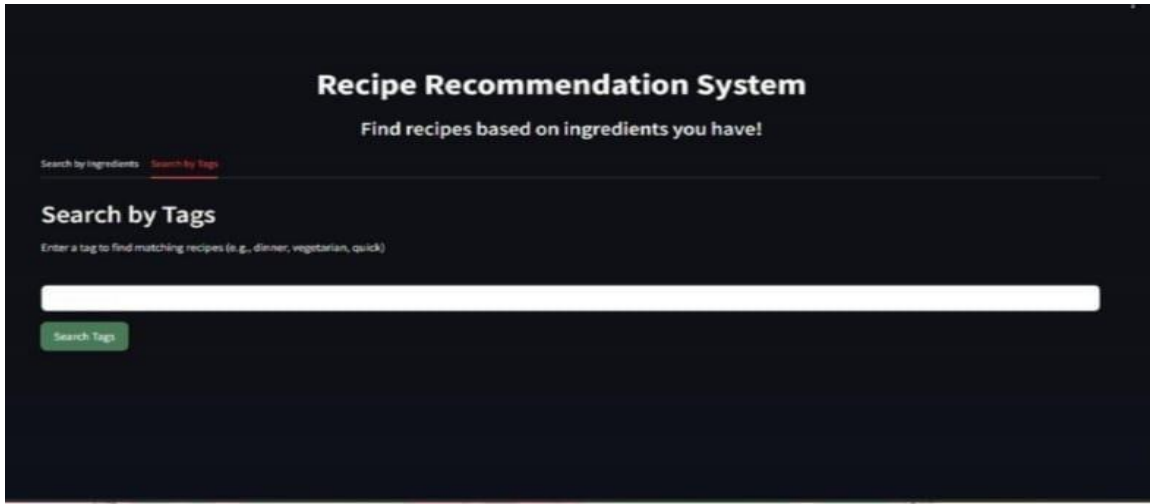
RESULT

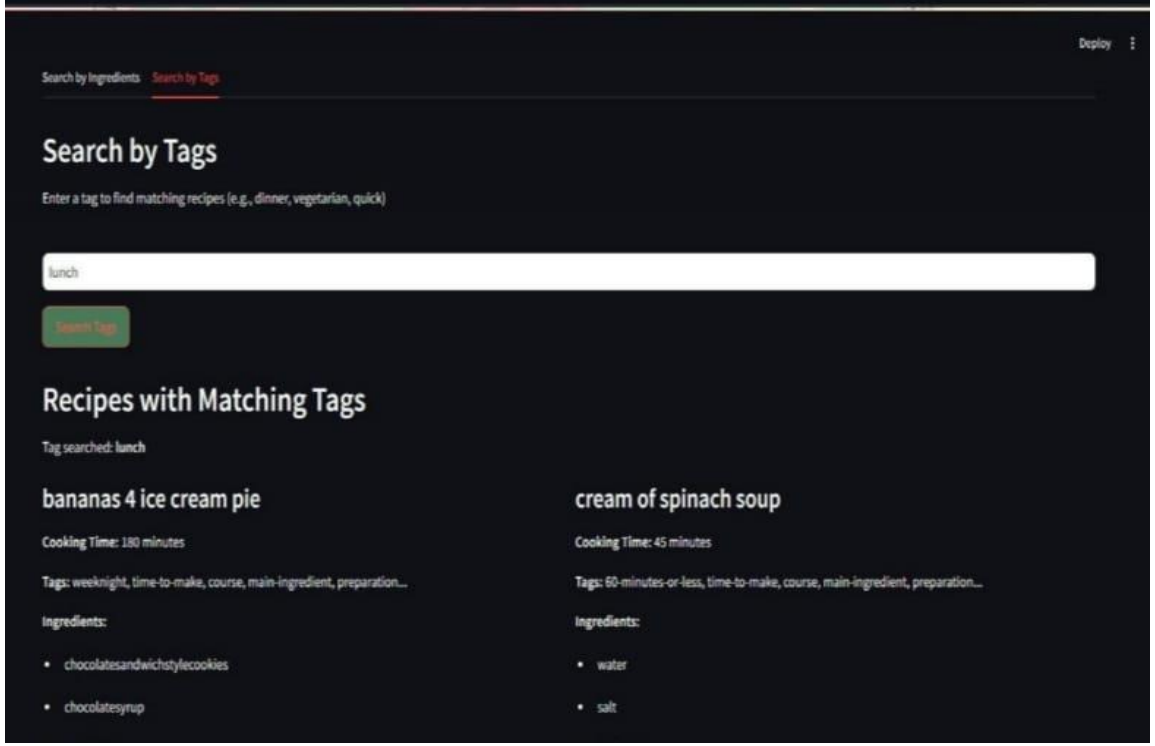


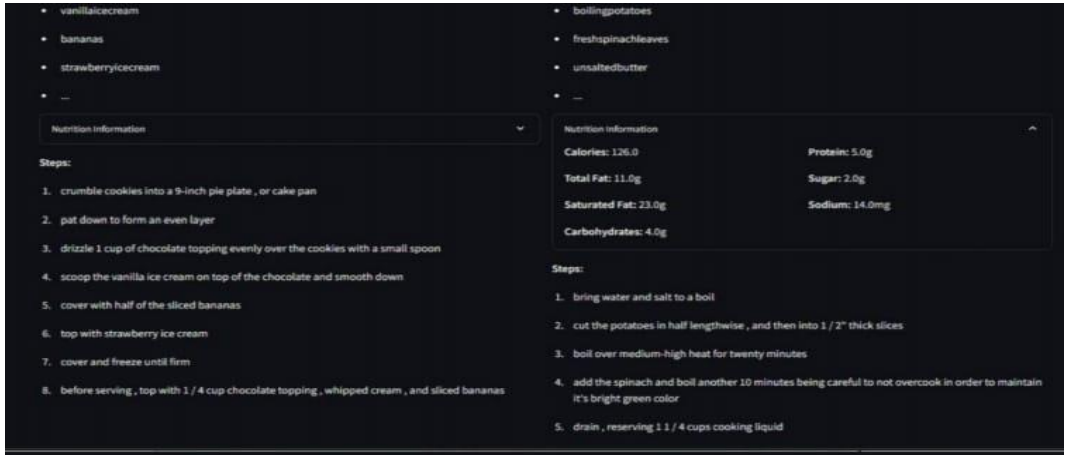
Output scree 1.1

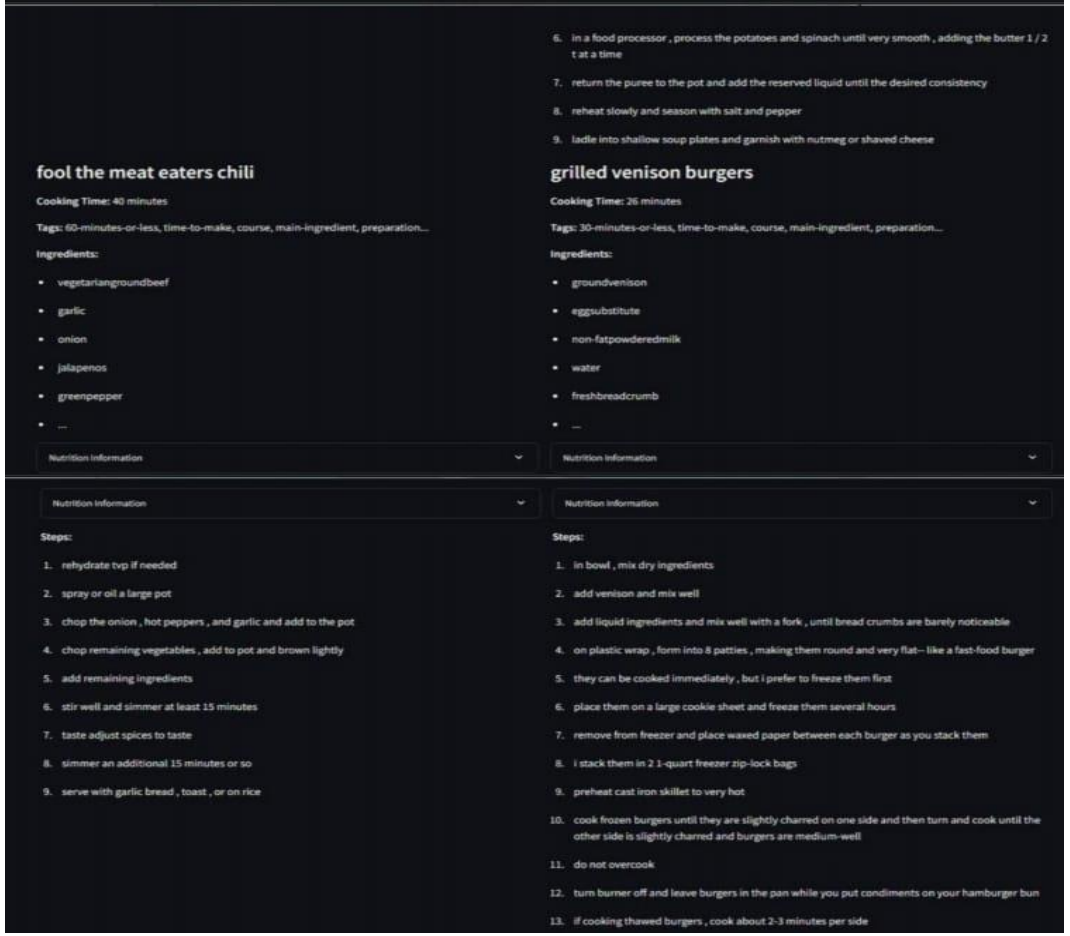

Deploy
uncooked portions can reach hot pan surface , tilting pan and moving as necessary
6. continue until the egg is set and will not flow
7. fill the omelet with 1 / 2 cup of desired mixture
8. with a pancake turner , fold omelet in half
9. invert onto plate and serve immediately
Match score
Match score: 0.82
cracker eggs
Cooking Time: 10 minutes
Tags: 15-minutes-or-less, time-to-make, course, main-ingredient, cuisine...
Ingredients:
eggs
butter
crackers
Nutrition Information
Steps:
10. cool completely
11. cut into 2" squares
Match score
Match score: 0.82
easy pasta with eggs
Cooking Time: 20 minutes
Tags: 30-minutes-or-less, time-to-make, course, main-ingredient, preparation...
Ingredients:
pasta
eggs
butter
Nutrition Information
Calories: 420.4
Protein: 33.0g
Deploy
Steps:
1. put all ingredients in frying pan & whisk every few minutes until thoroughly cooked and serve
Match score
Match score: 0.82
Total Fat: 30.0g
Sugar: 7.0g
Saturated Fat: 48.0g
Sodium: 8.0mg
Carbohydrates: 14.0g
Steps:
1. cook pasta to al dente , according to package directions
2. drain well
3. add butter to pan , and allow to melt
4. return drained pasta and mix well with butter
5. in a separate bowl , beat eggs well
6. add the eggs to pan , and mix well
7. return to med heat , and stir continuously , scraping egg from bottom , until eggs are scrambled well and cling to pasta
8. this step goes very quickly , so watch pot closely
9. serve immediately
10. to easily clean pan , rinse with cold water
11. empty pan of water , and add a generous portion of salt , and a dot of dish detergent to pan


Recipe Recommendation System
localhost:8501
Deploy
Recipe Recommendation System
Find recipes based on ingredients you have!
Search by Ingredients
Search by Tags
Enter Your Ingredients
Enter ingredients separated by commas (e.g., potato, butter, garlic)
eggs,butter
Find Recipes
Recommended Recipes
Based on your ingredients: eggs, butter
40 second omelet
Cooking Time: 25 minutes
chocolate chip marble squares
Cooking Time: 30 minutes
Deploy
Tags: 30-minutes-or-less, time-to-make, course, main-ingredient, preparation...
Ingredients:
eggs
water
butter
Nutrition Information
Calories: 248.8
Protein: 25.0g
Total Fat: 33.0g
Sugar: 3.0g
Saturated Fat: 51.0g
Sodium: 9.0mg
Carbohydrates: 0.0g
Steps:
1. beat together eggs and water until blended
2. in a 10-inch omelet pan heat butter until just hot enough to sizzle a drop of water
3. pour in egg mixture
4. mixture should set immediately at edges
5. with an inverted pancake turner , carefully push cooked portions at edges toward center so
Tags: 30-minutes-or-less, time-to-make, course, main-ingredient, preparation...
Ingredients:
chocolatechipcookiemix
eggs
butter
Nutrition Information
Steps:
1. preheat oven to 350 degrees
2. in large bowl , combine the cookie mix , eggs and butter
3. mix well
4. melt over hot water , morsels from the mix
5. set aside
6. spread half the cookie batter evenly into a lightly greased square baking pan
7. dollop melted chocolate alternately with remaining batter on top
8. with a knife , swirl dough with chocolate to marbleize
9. bake approximately 20 minutes


Recipe Recommendation System
Find recipes based on ingredients you have!
Search by Ingredients
Search by Tags
Search by Tags
Enter a tag to find matching recipes (e.g., dinner, vegetarian, quick)
Search Tags


Deploy
Search by Ingredients
Search by Tags
Search by Tags
Enter a tag to find matching recipes (e.g., dinner, vegetarian, quick)
lunch
Search Tags
Recipes with Matching Tags
Tag searched: lunch
bananas 4 ice cream pie
Cooking Time: 180 minutes
Tags: weeknight, time-to-make, course, main-ingredient, preparation...
Ingredients:
chocolatesandwichstylecookies
chocolatesyrup
cream of spinach soup
Cooking Time: 45 minutes
Tags: 60-minutes-or-less, time-to-make, course, main-ingredient, preparation...
Ingredients:
water
salt


vanillaicecream
bananas
strawberryicecream
...
Nutrition Information
Steps:
1. crumble cookies into a 9-inch pie plate , or cake pan
2. pat down to form an even layer
3. drizzle 1 cup of chocolate topping evenly over the cookies with a small spoon
4. scoop the vanilla ice cream on top of the chocolate and smooth down
5. cover with half of the sliced bananas
6. top with strawberry ice cream
7. cover and freeze until firm
8. before serving , top with 1 / 4 cup chocolate topping , whipped cream , and sliced bananas
boilingpotatoes
freshspinachleaves
unsaltedbutter
...
Nutrition Information
Calories: 126.0
Protein: 5.0g
Total Fat: 11.0g
Sugar: 2.0g
Saturated Fat: 23.0g
Sodium: 14.0mg
Carbohydrates: 4.0g
Steps:
1. bring water and salt to a boil
2. cut the potatoes in half lengthwise , and then into 1 / 2" thick slices
3. boil over medium-high heat for twenty minutes
4. add the spinach and boil another 10 minutes being careful to not overcook in order to maintain it's bright green color
5. drain , reserving 1 1 / 4 cups cooking liquid
6. in a food processor , process the potatoes and spinach until very smooth , adding the butter 1 / 2 t at a time
7. return the puree to the pot and add the reserved liquid until the desired consistency
8. reheat slowly and season with salt and pepper
9. ladle into shallow soup plates and garnish with nutmeg or shaved cheese


fool the meat eaters chili
Cooking Time: 40 minutes
Tags: 60-minutes-or-less, time-to-make, course, main-ingredient, preparation...
Ingredients:
vegetariangroundbeef
garlic
onion
jalapenos
greenpepper
...
Nutrition Information
Steps:
1. rehydrate tvp if needed
2. spray or oil a large pot
3. chop the onion , hot peppers , and garlic and add to the pot
4. chop remaining vegetables , add to pot and brown lightly
5. add remaining ingredients
6. stir well and simmer at least 15 minutes
7. taste adjust spices to taste
8. simmer an additional 15 minutes or so
9. serve with garlic bread , toast , or on rice
grilled venison burgers
Cooking Time: 26 minutes
Tags: 30-minutes-or-less, time-to-make, course, main-ingredient, preparation...
Ingredients:
groundvenison
eggsubstitute
non-fatpowderedmilk
water
freshbreadcrumb
...
Nutrition Information
Steps:
1. in bowl , mix dry ingredients
2. add venison and mix well
3. add liquid ingredients and mix well with a fork , until bread crumbs are barely noticeable
4. on plastic wrap , form into 8 patties , making them round and very flat-- like a fast-food burger
5. they can be cooked immediately , but i prefer to freeze them first
6. place them on a large cookie sheet and freeze them several hours
7. remove from freezer and place waxed paper between each burger as you stack them
8. i stack them in 2 1-quart freezer zip-lock bags
9. preheat cast iron skillet to very hot
10. cook frozen burgers until they are slightly charred on one side and then turn and cook until the other side is slightly charred and burgers are medium-well
11. do not overcook
12. turn burner off and leave burgers in the pan while you put condiments on your hamburger bun
13. if cooking thawed burgers , cook about 2-3 minutes per side

RESULTS

```
user_ingredients =['potato','butter']
suggested_recipes = suggest_recipes(user_ingredients)
print(suggested_recipes)
```

```
                                                    name  minutes  \
54881   classic pommes anna   simple french gratin pot...       75
67295                               crunchy pierogies pie       25
98096                              grill potatoes in foil       50
111846                          irish fadge  potato cakes       55
156790                             pearson clam chowder        10
164487                         potato and cheese omelette       15
209150       tattie scones  potato scones or potato cakes       45
228172                           world s best baked potato       61
737                        1 bowl 1 person mashed potatoes       25
56510                                          colcannon       35

                                                     tags  \
54881   ['time-to-make', 'course', 'main-ingredient', ...
67295   ['30-minutes-or-less', 'time-to-make', 'course...
98096   ['60-minutes-or-less', 'time-to-make', 'course...
111846  ['60-minutes-or-less', 'time-to-make', 'course...
156790  ['15-minutes-or-less', 'time-to-make', 'course...
164487  ['15-minutes-or-less', 'time-to-make', 'course...
209150  ['60-minutes-or-less', 'time-to-make', 'course...
228172  ['time-to-make', 'main-ingredient', 'preparati...
737     ['30-minutes-or-less', 'time-to-make', 'course...
56510   ['60-minutes-or-less', 'time-to-make', 'course...

                                                    steps
54881   ['pre-heat the oven to 200c / gas 6', 'put the...
67295   ['preheat oven to 425', "boil pierogies for 3-...
98096   ['make one per person , leave out onion for ki...
111846  ['mash the potatoes', 'sprinkle with salt and ...
156790  ['mince or chop the clams', 'mix all ingredien...
164487  ['melt the butter in a frying pan', 'when hot ...
209150  ['put the peeled and chopped potatoes in to a ...
228172  ['take medium-sized potato', 'split while raw'...
```

```
user_ingredients =['cheese','milk']
suggested_recipes = suggest_recipes(user_ingredients)
print(suggested_recipes)
```

```
                                                 name  minutes  \
425                indian  macaroni and cheese          30
3371                          all purpose quiche        55
27427    boxed macaroni and cheese success  3          15
81933                famous eggs and bacon              7
125181             lll baking mix biscuits              15
127722              m   m s  hot chocolate              10
128075                        macaroni bake              55
135162  microwave macaroni and cheese for one            9
207301              swiss scrambled eggs                10
3441        all in one veggie mac and cheese            20

                                                    tags  \
425     ['30-minutes-or-less', 'time-to-make', 'course...
3371    ['60-minutes-or-less', 'time-to-make', 'course...
27427   ['15-minutes-or-less', 'time-to-make', 'course...
81933   ['15-minutes-or-less', 'time-to-make', 'course...
125181  ['15-minutes-or-less', 'time-to-make', 'course...
127722  ['15-minutes-or-less', 'time-to-make', 'course...
128075  ['60-minutes-or-less', 'time-to-make', 'course...
135162  ['15-minutes-or-less', 'time-to-make', 'main-i...
207301  ['15-minutes-or-less', 'time-to-make', 'course...
3441    ['30-minutes-or-less', 'time-to-make', 'course...

                                                    steps
425     ['first you want to take the block of cheese a...
3371    ['choose and prepare your choice of filling', ...
27427   ['boil macaroni , then drain', 'add milk , but...
81933   ['put 1 / 4 cup of bacon in the bottom of the ...
125181  ['stir liquid into mix just until moistened', ...
127722  ["place m & m's in blender", 'add hot milk', '...
128075  ['first boil macaroni noodles till soft', 'the...
135162  ['place macaroni and water in a bowl , stir', ...
```

Output Screens

CONCLUSION

- The AI Recipe Generator demonstrates the potential of machine learning and natural language processing (NLP) in revolutionizing the culinary experience. By analyzing vast recipe datasets, the system generates personalized, innovative, and diverse recipes based on user preferences and available ingredients.This project enhances culinary creativity, reduces food waste, and simplifies meal planning for both home cooks and professionals. The results highlight the efficiency of AI in automating recipe creation while maintaining taste, nutrition, and feasibility. With continuous improvements, this system can further evolve to support healthconscious meal planning, regional cuisines, and advanced flavor profiling, making AI a valuable tool in the food industry.

FUTURE SCOPE

1.User Feedback Integration

2. Voice Input and Output

3. Advanced Dietary Filters

4. Multilingual Support

5. Image-Based Ingredient Recognition

6. Personalized User Profiles

REFERENCES

Food.com Recipes and Interactions Dataset (Kaggle)

https://www.kaggle.com/datasets/irkaal/foodcom-recipes-and-user-interactions

Epicurious Recipe Dataset https://www.epicurious.com/ (used for reference and scraping)

Count Vectorizer & TF-IDF (Scikit-learn Documentation)

https://scikit-learn.org/stable/modules/feature_extraction.html#text-featureextraction

Cosine Similarity Explanation (Wikipedia)

https://en.wikipedia.org/wiki/Cosine_similarity

GitHub Link:

https://github.com/sumaadem10/-RECIPE-RECOMMANDATION-SYSTEM.git

Thank you