PROJECT PROPOSAL

ChefAI

Team Members:

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GitHub Repository:

https://github.com/cis3296s25/01-ChefAI

Project Board:

https://github.com/orgs/cis3296s25/projects/58

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Project Proposal

Project Abstract

This document proposes a novel application of a recipe generator that creates recipes based on the ingredients that are present at your disposal. Whether you are inexperienced with cooking or want to try a new cuisine with the ingredients at your disposal, ChefAI will create the ultimate recipe for you. Additionally, you might not know what your ingredients are, or you have too many ingredients. In that case, you can take a picture of the ingredients and allow the application to generate a tasty recipe. The application will allow you to explore all cuisines and create delicious recipes in just a few clicks.

High Level Requirement

Describe the requirements – i.e., what the product does and how it does it from a user point of view – at a high level. (You can include screenshot mockup of the interface)

Conceptual Design

Recipe Cooker will be created using:

1. Backend: Python, Django
2. Frontend: HTML, CSS, JavaScript
3. Libraries:
    a. JavaScript: React
    b. Frameworks: Python: Django
4. APIs:
    a. Python: MealDB, Salesforce BLIP, ChatGPT.
5. Database:
    a. SQLite

We will be coding the logic of the program in Python. We will use Django framework for the backend and Javascript for the frontend. Image detection models will be used to detect ingredients in the images that would be accessed through APIs using Python.

The User input would be converted into a dictionary of ingredient names and quantity, which would be fed to an LLM leveraged by Retrieval-Augmented Generation to produce more informed and relevant recipes.

The front end would comprise of HTML and CSS for structure and presentation, and JavaScript would be responsible for the user interaction and actions.

Proof of Concept

Here is the github URL with all the project files:

https://github.com/Sahil-Jartare/Recipe-Cooker.git

Step 1 - Create a python virtual environment with version 3.8 and install openai, and other packages.

Step 2 – Run index.html in live server.

Background

The purpose of ChefAI is to generate accurate and tasty recipes based on the ingredients and their quantity. It will have an interactive UI allowing you to select the ingredients you have at your disposal or upload image/s of your ingredients along with the quantity of each ingredient.

This app is aimed to assist inexperienced cooks in making tasty food based on the ingredients they have at their disposal. There are times when you know only one recipe or have insufficient ingredients to make the recipe you know. There are also times where you want to try something new with the ingredients you have. Another vision of this app is to reduce the time of searching recipes and provide only relevant recipes with ingredients that are readily available to use at your disposal.
For times like these, all you have to do is type in the ingredients on the search bar or take a picture of all the ingredients you have and wait for the application to generate you the most optimal recipe.

This application is inspired by existing applications such as SuperCook(https://www.supercook.com/#/desktop) and DishGen(https://www.dishgen.com/), that present the user with the best recipe based on ingredients or a short description of the ingredients you would like to use.

This application will differ and improve in the following ways:

1. We will use AI to generate recipes perfect for the amount of ingredients you have.
2. We will allow the user to upload a picture of their ingredients and generate a recipe based on the ingredients.

Required Resources

- The resources required for this project are available for free. Only a laptop and IDE is required to implement the application.
- The required packages and development kit would be downloaded in their respective environments, and the group members would have access to all the files through GitHub.
- We will need to acquire knowledge on the frameworks used and learn how to integrate the various parts of the project together.
- We will have free access to the APIs for open-source models for free except for the ChatGPT API.

Project Design

Vision

FOR the inexperienced, impatient, and indecisive cooks WHO are keen on cooking food without wasting time on searching for recipes that match the availability of their ingredients, ChefAI is a Web Application powered by AI to efficiently generate the most

ideal recipe for the ingredients at your disposal THAT would take in your favored ingredients, the quantity of ingredients and the preferred cuisine UNLIKE other online free recipe providers, OUR product is powered by Artificial Intelligence to curate the perfect recipe for you at the cost of a dozen bananas.

Persona Rohan, age 20, sophomore at Dillan University

Rohan, age 20, sophomore in Dillan University studying Computer Science and Psychology. He has come for a study abroad from Mumbai, India to Philadelphia, U.S.A because he wanted to experience American culture and education. He is frugal in spending and loves to try out new food, but with his budget he cannot afford eating outside every day. Since he is a Computer Science major, he is great at using new technologies and loves to experiment with them. He has never cooked before as he never had to worry about it back home but looking at the costs of buying food in America, he is particularly keen on trying it. He does not know much about cooking and would like to search for recipes easily that provide step by step details down to the utensils that are used. Along with that he would like to try out new cuisines as he gets better. Thus, he would be interested in using ChefAI for recipes that are easy to understand and are filled with recipes of different cuisines.

Persona Michele, age 32, a housewife

Michele, age 32, is a housewife living in the suburbs of New Jersey. She does not know how to drive and relies on her husband to take her to the super-market to shop for food. Whenever she goes grocery shopping, she makes sure to buy for the whole week but sometimes over buys. She loves cooking and tries new recipes from her cookbook every day but sometimes she does not have a certain ingredient listed in the cookbook and is unable to make the recipe anymore. Then all the other ingredients that are used in the recipe are potentially wasted. Michele would like to use ChefAI that would show her a recipe that would use all the ingredients at her disposal and would provide detailed description of each step on the way.

Persona Bob, age 58, an accountant

Bob, age 56, is a salary man working as an accountant in Japan. He works 50 hours week and eats outside most of the time during the week. To relax, he makes sure to make time to cook at least once during the weekend, but since he does not cook much, he has minimal ingredients at home. He is a hard worker, but is bad with technology and very impatient. He does not like to waste time on searching recipes as most of the time he does not have all the ingredients required. He would prefer using ChefAI, as it would provide him quick, simple and tasty recipes with only ingredients that are on hand and would save the time of searching online for recipes that match the ingredients he has.

Persona Mark, age 23, a recent college grad

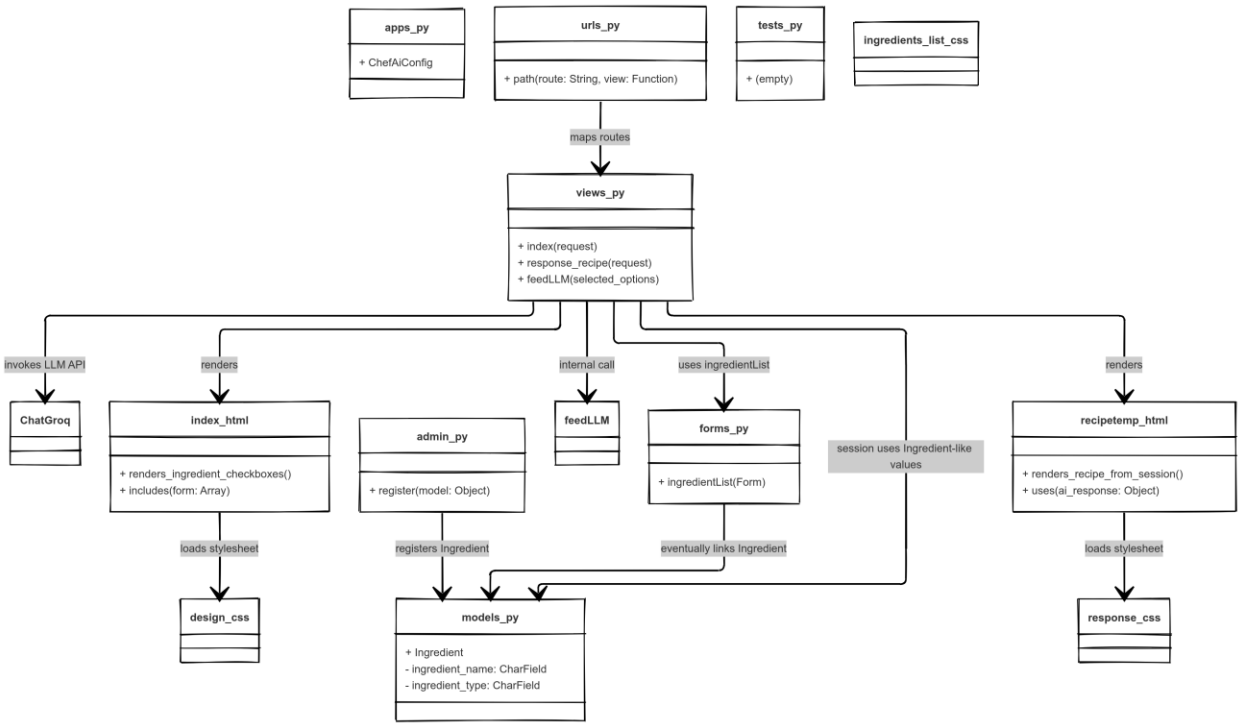
Mark, age 23, is a new college graduate from Temple University. He has just started his job in a new state that prevents him from living close to those who he grew up with. Being a new graduate with student loans needing to be paid back, Mark is trying to save money which means he is trying to cook at home more often. However, Mark has never had a reason to cook before since he was always able to depend on his parents for meals. To save money, Mark went to the grocery store and bought items that were familiar to him. The items that he ended up with were items that his parents would normally purchase.

Mark's experience in the kitchen is minimal. He can do regular prep work in the kitchen due to helping his parents cook large meals for holidays, but needs to be told what to do. Staring in his fridge of new groceries, Mark is unsure how to turn all those ingredients into a nice meal. Being young and familiar with all the technology around him, he discovers Chef-AI and is relieved because he knows that he will easily be able to discover a nice meal from the ingredients he just bought.

Persona Jason, age 28, junior investment banker

Jason, age 28, works as a junior investment banker in Manhattan. He's constantly drowning in 80-90 hour weeks, often stuck at the office past midnight finishing pitch decks and financial models. Even though he makes good money, he barely gets to enjoy it - his schedule is brutal. His expensive apartment might as well be a storage unit, and his fridge is a sad collection of energy drinks, an unopened bottle of champagne from his last promotion, and takeout containers in various states of decay. Growing up, his family had people who cooked for them, and in college, he just hit the dining hall. These days, he lives off expensive delivery and whatever catering shows up at the office. His doctor recently gave him grief about his cholesterol and told him to start eating better. Jason can definitely afford groceries, but he has no clue what to do in a kitchen and finds the whole thing intimidating. He's hoping ChefAI can give him some dead-simple recipes that won't take forever, don't need fancy equipment (his kitchen is basically empty), and are impossible to screw up - even for a sleep-deprived banker who's never cooked anything more complicated than toast

Class Diagram



- UML shows the main controller logic resides in views.py. The index() hands the form submission from index.html, processes selected ingredients, and call feedLLM() to get an AI-generated recipe by invoking ChatGroq LLM API
- forms.py contains the ingredientList form, which defines types of ingredients. Used by views.py > index() to process form data
- models.py defines Ingredient which will be used to store ingredients and is registered in the admin panel planned for database integration
- index.html is the main user interface which renders checkboxes for each group from forms. Loads design.css as its primary stylesheet
- recipetemp.html displays the AI-generated recipe using data from session in views.py. Loads stylesheet response.css
- design.css is used in index.html to style layout and elements for selection
- response.css used in recipetemp.html, styles the layout of the displayed recipe
- urls.py routes to the functions in view.py

Features:

1. Interactive Chatbot interface.
2. Input cuisine, utensils, and devices that you have such as sauté-pan, oven, and microwave.
3. Image upload features, for all your ingredients.

4. Table of ingredients to select from with quantity.
5. Implementation of RAG with Recipe database to create more accurate recipes
6. Save the recipe in JPG or PDF to your phone.
7. Link to ingredients, pans, and steps during the cooking process that when hovered over would show an image describing them.

How To Run:

1) Ensure Python3 is installed on the development computer
2) Obtain API key from Groq Cloud
3) Fork repository
4) Git clone repository
5) Create ".env" file in the project root.
   a) Inside the file, create variable:
      i) `GROQ_API_KEY = "YOUR_API_KEY"`
6) Create a virtual environment using the command:
   a) python -m venv myenv
7) Activate the virtual environment with the command:
   a) source myenv/bin/activate (Linux system)
   b) myenv/Scripts/activate (windows system)
8) Navigate to the folder that has the file requirements.txt and type the command:
   a) pip install -r requirements.txt
9) Now cd into the directory that has the manage.py file & run the following command:
   a) python manage.py runserver

Visit http://127.0.0.1:8000

Project Progress

Week 2 Progress

Sprint Goal: The goal was to implement "Select ingredient from predefined list for getting a recipe from the list of ingredients chosen," feature.

Backlog Features

- Implemented ingredient selection from a predefined list to retrieve recipes.
- Allow users to click "Generate Recipe" after selecting ingredients, redirecting them to the response.html page.
- Display AI-generated recipe on the response.html page, including step-by-step instructions and a list of necessary ingredients.
- Modularize the ingredient selection form.
- Set up basic environment configuration
- Deploy the website to EC2 for testing and accessibility.

Task in Sprint	Task Status at the end of Sprint	Assigned to
Create a form in Django for users to select from a list of items	Completed	Michael
Populate a list of items to populate the form	Completed	Kevin
Obtain API key for LLM	Completed	Shrey
Create a template for the recipe	Completed	Kevin
Create a template for the checkbox	Completed	Kevin
Create an env file	Completed	Michael, Shrey, Kevin, Omais, & Sahil
Take a look at the response from LLM and suggest how we should present the response to the client (response.html)	Completed	Omais
Create git tag and version release	Completed	Kevin
Deploy to EC2	Completed	Michael

Add prompt to code to generate response	Completed	Sahil
Create optimal prompt for LLM to take in value of checked boxes and generate a recipe	Completed	Sahil
Set up the database	Completed	Michael
Create a admin account to view tables	Completed	Michael
UML Diagram	Completed	Omais
Update project report with new project progress section	Completed	Shrey