

# < World Cuisine Recipes Recommender >

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## **1. Project Specification**

The project in COMP 47980: Generative AI and Language Models, titled "Building an LLM Genie using the Assistants API," is a coursework project meant to develop a customized assistant with LLM. This assistant would be customized to work in a certain domain, portraying a unique personality and skill set selected by the designer. This project leans on the Assistants API from OpenAI, which allows to build an assistant with capabilities beyond the generic provided by ChatGPT, such as specific-domain data and functionality like retrieval-augmented generation (RAG), prompt engineering and code parsing and APIs to make function calls.

### **1.1 Core objectives**

#### **1. Understanding and using LLMs:**

The project's key is to model LLMs' generative capability With OpenAI API to produce answers according to prompts.

#### **2. Create a Domain-Specific Assistant:**

Make your assistant particular to a domain such as health, programming, or education, and make it just fill a niche role. The existing widgets in ChatGPT are called GPTs. This will allow it to have its own personality while boosting user engagement and specificity.

#### **3. Technical Implementation:**

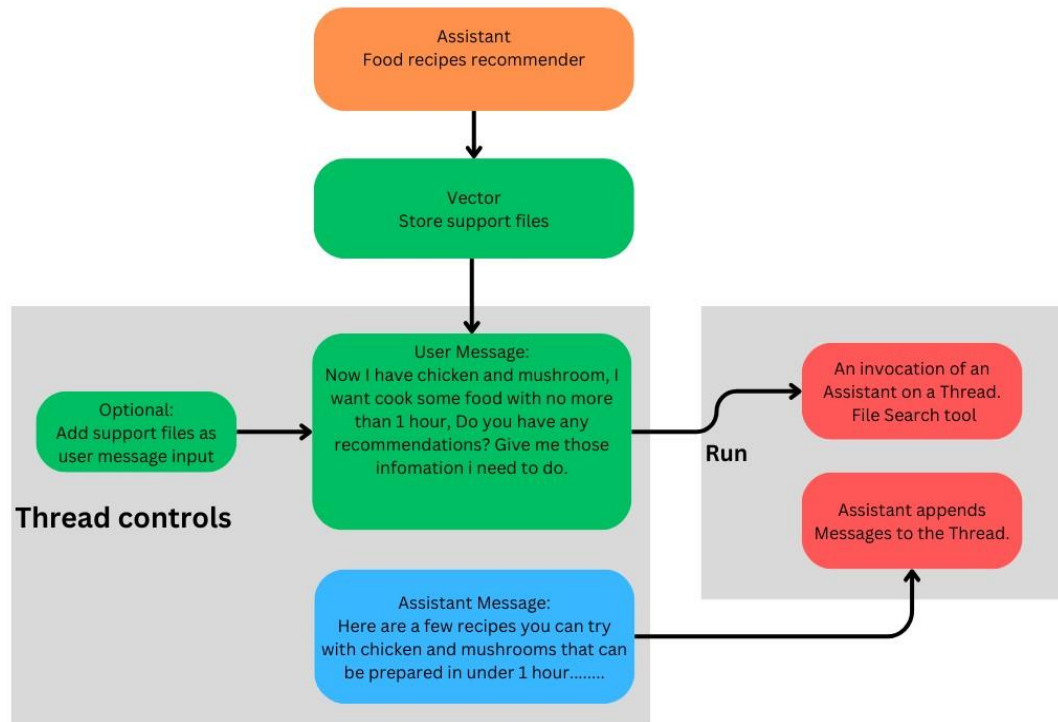
The technical setup is going to be coding with Python, using the OpenAI Assistants API and cloud-based tools like Google Colab and Google Drive. Further functionalities may include leveraging external data sources or papers and may enable LLM to perform other tasks such as code interpretation or dynamic file retrieval.

## **2. Introduction**

In this project, we specific our personalized assistant as a food recipe recommender, which support with 2 extra files, one is pdf format, and one is Json format. Each file includes the recipe for worldwide food, like recipe URL, food name, number of people serves, cooking time, ingredients need, Utensils and steps/method. In the PDF file, the content of recipes is already categorized in different types, like for vegetarian or easy breakfast. The aim is when user wants to ask any food recipe, that assistant can answer all the information that can teach how to cook a delicious meal. This assistant can help people who want to cook and do not familiar with cooking. It can help them with all information that a meal needs.

### 3. Assistant Design: A Schematic View

The following diagram shows the assistant design by different components



In this section will describe code implementation with 5 steps:

#### 1. Create assistant:

The assistant component is Purpose-built AI that uses OpenAI's models and calls tools. We give the assistant name as "World Cuisine Recipes Recommender". And an instructions message:

**"You are a world food recipes recommender. When a user asks about a dish, provide details including the food name, time to prepare, steps, any tags and ingredients needed. "**

The instructions message helps the assistant to know his "job", what kind of answer we can get in the conversation. Depends on various demands and budgets for a personalized assistant, we can use existing ChatGPT3.5/4 models to assistant, it is a parameter when we create the assistant. Because we need support files, we add tools type with **"file\_search"** which can help assistant to scan the files we have given in next part. And another choice like **"code\_interpreter"** is a choice when you want use programming to answer questions, or you can just add a sentence: "write and run code to answer the question." Instead of use code\_interpreter tool.

## 2. Create a Vector store the supporting files:

To access the files, the (file\_search) tool we mentioned before that uses the Vector Store object. It just needs to upload files to OpenAI that you want to use in the vector stores. When the files ready, the "file\_batch" status will shows completed. Then we just need update the assistant to use the vector store with its id.

## 3. Create a Thread:

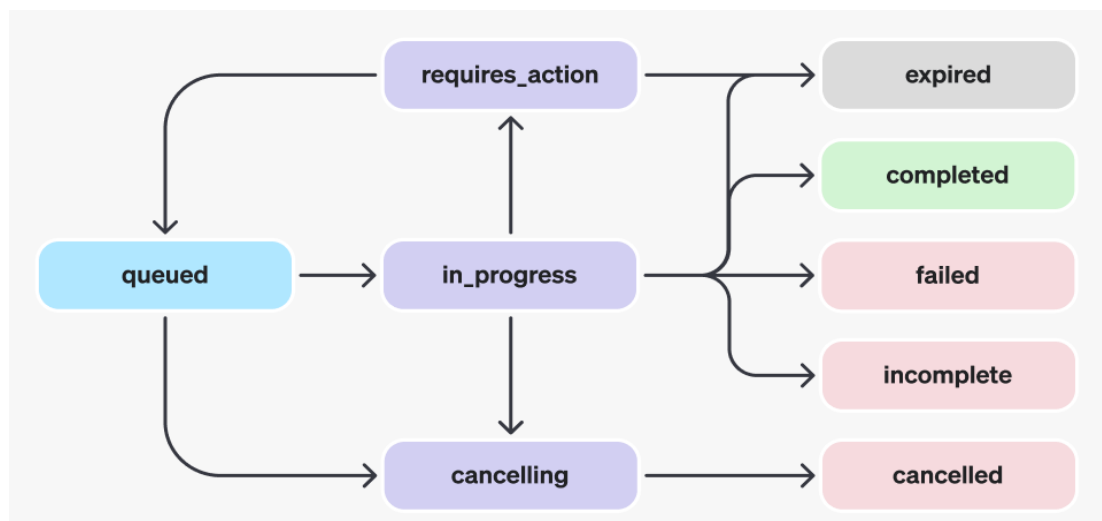
The thread is a conversation session between an Assistant and a user. Threads store Messages and automatically handle truncation to fit content into a model's context. We can also attach any files as user message attachments into thread. When you create a Run on this thread, the file search tool will query both the vector store from your assistant and the vector store on the thread.

## 4. Add message to thread:

A user message is required as input in the conversation. It stored as a list on the thread. Now an example **"Now I have chicken and mushroom, I want cook some food with no more than 1 hour, do you have any recommendations? Give me that information I need to do."** Will be use here.

## 5. Runs and Run steps.

A run is essential in the whole process, it is an invocation of an Assistant on a Thread. The Assistant works by calling the models and tools to perform the tasks using its configuration and the Thread's Messages. The Assistant should be appended Messages as part of a Run, which it does by appending them to the thread. And we can change the configuration here to use different models, instructions, and tools here. Following diagram shows a life cycle of Run[[Link](#)].



The most important last step is achieving real-time conversation with ChatGPT, The functions “**create\_message\_and\_run**” and “**submit\_tool\_outputs**” are designed to handle specific parts of interaction within a conversational thread using a client API. Conversations via threads and processes inputs through runs. These functions facilitate creating and managing conversational content dynamically, making them ideal for applications requiring real-time interaction and processing based on user inputs. They also imply a modular approach where different stages of conversation handling are encapsulated into specific functions, promoting reusability and maintainability within the larger application structure. There is a parameter in “**run.status**” that controls the conversation when it is set to “**required\_action**”. Then “**run**” needs to set right into the thread with continuous messages and when it is set to “**completed**” means that the assistant reply is finished.

#### 4. Outside Knowledge: Curated Data Sources

From online materials, useful files like PDF, text, and JSON can be leveraged to help assistants pre-defined their knowledge. After searching in Google, the pdf file [url] can support the assistant to get 10 different types of food. It includes the details of a meal need, like number of servings, timing, utensils, ingredients, and method. Here is an example.

The screenshot shows a recipe website with a navigation bar at the top containing categories: MEASURES, INTRO & CONTENTS, BREAKFAST, SOUPS, BEEF, LAMB & PORK, FISH, CHICKEN & TURKEY, VEGETARIAN, SNACKS & LIGHT MEALS, SALADS, and DESSERTS. The main content area features a recipe for 'French toast'. On the left, there is a photo of French toast topped with strawberries and blueberries. Below the photo, a green box contains the following details: 'Serves 2 adults' with a person icon, 'Preparation time 5 minutes' with a 5-minute clock icon, 'Cooking time 5 minutes' with a 5-minute clock icon, and 'Utensils needed' listing 'Frying pan' and 'Shallow bowl' with a bowl icon. To the right of the photo, the title 'French toast' is displayed in green, followed by the instruction 'Serve with fruit'. Below this, the 'Ingredients' section lists: 2 eggs, 30 ml of low-fat milk, pepper, pinch of salt if desired, 1/2 tsp of cinnamon, 1 tsp of vanilla extract, 4 slices of bread, and 20 ml of vegetable oil. The 'Method' section lists four steps: 1. Beat egg, milk, pepper, salt, cinnamon and vanilla together in a shallow bowl; 2. Dip the slices of bread in the egg mixture; 3. Fry in hot oil until they are golden brown; 4. Drain on kitchen paper.

The [Json](#) file that includes 1600 food recipes with the source link, which can help to find more information for the users. The description in Json file introduces a

detail of preparation and steps. The author of each recipe is from [BBC Good Food](https://www.bbcgoodfood.com) website.

#### Example

```
{
  "Name": "Christmas pie",
  "url": "https://www.bbcgoodfood.com/recipes/2793/christmas-pie",
  "Description": "Combine a few key Christmas flavours here to make a pie that both children and adults will love",
  "Author": "Mary Cadogan",
  "Ingredients": [
    "2 tbsp olive oil",
    "knob butter",
    "1 onion, finely chopped",
    "500g sausagemeat or skinned sausages",
    "grated zest of 1 lemon",
    "100g fresh white breadcrumbs",
    "85g ready-to-eat dried apricots, chopped",
    "50g chestnut, canned or vacuum-packed, chopped",
    "2 tsp chopped fresh or 1tsp dried thyme",
    "100g cranberries, fresh or frozen",
    "500g boneless, skinless chicken breasts",
    "500g pack ready-made shortcrust pastry",
    "beaten egg, to glaze"
  ],
  "Method": [
    "Heat oven to 190C/fan 170C/gas 5. Heat 1 tbsp oil and the butter in a frying pan, then add the onion and cook for 5 mins.",
    "Cut each chicken breast into three fillets lengthwise and season all over with salt and pepper.",
    "Roll out two-thirds of the pastry to line a 20-23cm springform or deep loose-based tart tin. Pre-heat the oven.",
    "Roll out the remaining pastry. Brush the edges of the pastry with beaten egg and cover with the remaining pastry.",
    "Set the tin on a baking sheet and bake for 50-60 mins, then cool in the tin for 15 mins. Remove the pie from the tin and serve."
  ]
}
```

## 5. Worked Examples

After these configuration steps, we can print our message content. We can also add content citations and URL when the assistant uses the support files. It is important to know where's the answer comes from. Here are two examples which shows whether or not add support files.

### Without files:

user: Now I have chicken and mushroom, I want cook some food with no more than 1 hour, Do you have any recommendations? assistant: I suggest making a delicious Chicken and Mushroom Stir-Fry! It's a quick and easy dish that can be prepared in under 1 hour. Would you like me to provide you with the recipe and ingredients needed? user: Now I have chicken and mushroom, I want cook some food with no more than 1 hour, Do you have any recommendations? Give me those information I need to do. assistant: Great choice! Here is the recipe for Chicken and Mushroom Stir-Fry:

#### Ingredients:

- 1 lb chicken breast, sliced into thin strips
- 8 oz mushrooms, sliced
- 1 onion, sliced
- 2 cloves garlic, minced
- 1 bell pepper, sliced
- 2 tbsp soy sauce
- 1 tbsp oyster sauce
- 1 tsp sesame oil
- 1 tsp cornstarch
- Salt and pepper to taste
- Vegetable oil for cooking
- Optional: sliced green onions and sesame seeds for garnish

#### Steps:

1. In a small bowl, mix together soy sauce, oyster sauce, sesame oil, and cornstarch. Set aside.
2. Heat some vegetable oil in a large pan or wok over medium-high heat.
3. Add the sliced chicken strips and stir-fry until they are cooked through. Remove from the pan and set aside.
4. In the same pan, add a little more oil if needed and sauté the garlic until fragrant.
5. Add the sliced onions and cook until they start to soften.
6. Add the sliced mushrooms and bell pepper. Stir-fry until the vegetables are tender.
7. Return the cooked chicken to the pan and pour the sauce mixture over the chicken and vegetables.
8. Stir well to coat everything in the sauce and cook for another 1-2 minutes.
9. Taste and adjust seasoning with salt and pepper if needed.
10. Garnish with sliced green onions and sesame seeds if desired.
11. Serve hot over steamed rice or noodles.

Enjoy your Chicken and Mushroom Stir-Fry!



## With files:

assistant: Of course! I can provide you with some food advice. Could you please specify if you are looking for cooking tips, recipe recommendations, dietary advice, or any particular food-related topic you would like to learn more about? Now I have chicken and mushroom, I want to cook some food with no more than 1 hour.

assistant: Here are a couple of recipes that you can prepare with chicken and mushrooms in under 1 hour:

### 1. Chicken Curry:

- **Ingredients:** Cooked chicken, button mushrooms, pepper, onion, peas, carrot, garlic, curry paste, vegetable oil, chicken stock.
- **Preparation Time:** 5 minutes
- **Cooking Time:** 15 minutes
- **Method:** Slice and cook vegetables and garlic, add mushrooms and pepper, stir in curry paste, cooked chicken, peas, and stock. Simmer for 10 minutes and serve with rice **[6:0†source]** .

### 2. Chicken in Tomato Sauce:

- **Ingredients:** Onion, carrot, garlic, parsley, vegetable oil, chicken breast fillets, passata or tomato-based pasta sauce, chicken stock, peas, black pepper.
- **Preparation Time:** 10 minutes
- **Cooking Time:** 40 minutes
- **Method:** Cook vegetables with garlic, add chicken, passata, chicken stock, parsley, cook covered, add peas and seasoning. Serve with rice **[6:0†source]** .

These recipes should be relatively quick to prepare and will result in delicious dishes using chicken and mushrooms. I also have some potatoes. Can you recommend some recipes?

assistant: Here is a recipe for "Butter-roasted supreme of chicken with wild mushroom & potato gratin" by Gordon Ramsay that you can try with your chicken, mushrooms, and potatoes. This recipe involves making a delicious chicken dish with a side of mushroom and potato gratin. You can access the full recipe details [here](#) **[10:1†source]** .

Another option is to prepare "Chicken and vegetable casserole" which can be served with boiled potatoes or rice. This recipe involves ingredients like chicken portions, carrots, onions, celery, mushrooms, peas, chicken stock, lemon juice, dried herbs, salt, and pepper. The preparation method includes baking the casserole dish with all the vegetables and chicken portions. The full method can be found in the document "101\_Square\_Meals.pdf" **[10:0†source]** .

These recipes should provide you with some delicious options to enjoy your chicken, mushrooms, and potatoes. Do you have a recommend starter with this meal?

assistant: I found a couple of starter recipes that you can consider serving with your chicken, mushroom, and potato meal:

### 1. Butter Bean Pâté with Melba Toast:

- **Description:** This quick pâté can be ready in 15 minutes, making it a perfect last-minute starter.
- **Ingredients:** Olive oil, shallot, garlic, butter beans, soured cream, fresh parsley, white bread slices.
- **Method:** Cook the shallot and garlic, then mash the butter beans with soured cream, parsley, and seasonings. Chill until serving. Toast white bread slices and serve with the pâté **[14:7†source]** .

### 2. Mushroom & Olive Tatins:

- **Description:** A versatile dish that can be served as a starter, main, picnic, or snack. Smart enough for entertaining yet easy for everyday.
- **Ingredients:** Portabellini mushrooms, olive oil, thyme, puff pastry, pine nuts, olives, vegetarian tapenade, extra-virgin olive oil, balsamic vinegar, rocket leaves.
- **Method:** Roast mushrooms with thyme, then arrange them in tins and top with pine nuts, olives, and tapenade on pastry circles. Bake until golden. Serve with a drizzle of extra-virgin olive oil, balsamic vinegar, and rocket leaves **[14:8†source]** .

These starter recipes should complement your chicken, mushroom, and potato meal nicely. stop

Through the implementation of support files, the assistant can access predefined information that will put him in a position to search content effectively and issue accurate answers. This capability is particularly useful in scenarios such as a number of recipes, where the system would have access to a diverse database of information and hence be capable of providing varied options to the user. Secondly, the use of support files will ensure a richer context of the conversation. The assistant can get back to it and update the responses that follow from the evolving user's message through the contained information in the files during the conversation progress. This ongoing reference with contextual data helps in tailoring responses more precisely to user queries.

In other words, the assistant will lose depth without the support files and may not be able to provide correct information with accurate data unless the reply conversation is more detailed and includes all the needed reference details. An assistant relying only on the interaction history in the current thread could not support overly complex queries. This is important to keep the interaction going in a kind of extended conversation. The assistant continues referring to the relevant data in support files until the user decides to kill the conversation by feeding "stop." These support files enhance the capabilities of the Assistant to give more accurate, knowledgeable, and varied answers based on a solid foundation of predefined information. This would further serve to enhance both user satisfaction, deriving from more relevant answers, and to make the assistant more efficient in dealing with ongoing conversations.

## 6. Summary and Conclusions

This assistant is designed to teach and help cook the world's delicacies, offering great guidance with exact details step by step to people. Accordingly, a great focus was placed on a major objective—making cooking a delightful experience. Considering that food is indispensable in our daily lives, then a well-prepared meal can completely be centering one's day. To this effect, the assistant presents a variety of recipes in the most effective way that enables users to make a choice depending on their tastes and preferences.

This assistant can be developed in future works for a website. The users could easily see a lot of recipes and photos. They can use any time to make the favorite meal of their choice at home not only based on text. The support files will also be updated from time to time so that they can provide current and relevant recipe information that shall make the user enjoy the full experience.

This continued development and improved assistance, as well as its resources, is set to underpin our mission of making cooking accessible and enjoyable for all, any time you want to create a delightful meal.

## 7. Acknowledgements and references

The following website helped me to implement this project.

1. <https://platform.openai.com/docs/overview> OpenAI API docs
2. <https://blog.futuresmart.ai/openai-function-calling-explained-chat-completions-assistants-api> OpenAI Function Calling Explained: Chat Completions & Assistants API Pradip Nichite Nov 20, 2023
3. [https://www.youtube.com/watch?v=pI1yUiNKyDA&ab\\_channel=PradipNichite](https://www.youtube.com/watch?v=pI1yUiNKyDA&ab_channel=PradipNichite)
4. <https://www.bbcgoodfood.com/>