

System Description

SweetBot is a chatbot that fetches dessert recipes for the user. It starts off with a greeting. It will ask the user for its name and check if that name is in the user model. If it is, it will fetch the users known food allergies. If it's not in the user model, it will prompt the user to enter their food allergies. It will add the user's name and food allergies into the user model. Once the chatbot knows your food allergies it will then ask you what dessert you want the recipe for. It will then execute an API call to chat gpt's 3.5 turbo model with the specified dessert and the user's food allergies as the parameters. The chatbot will then print out the resulting output.

SweetBot uses spaCy's NER (Named Entity Recognition) function which identifies and classifies named entities in text. It is used to extract the user's name from input. It will take in a string and use the pre-trained 'en_core_web_sm'

language model to assign labels. The program filters for labels with the 'PERSON' tag.

SweetBot also uses NLTK's POS Tagging. It will first preprocess text, by first tokenizing the text and then removing stop words and non-alphabetic characters, and lemmatizing. It will then perform the built in `nltk.pos_tag()` function on the lemmas to identify their parts of speech. Then it extracts the nouns by using regex on the tags filtering for tags that begin with 'N'. These nouns will be the food items that the user has input when prompted for their food allergies.

How To Run

1. Make sure the `user_model.csv` file is in the same folder as the `chatbot.py` file.
2. If you don't already have them, install these dependencies:

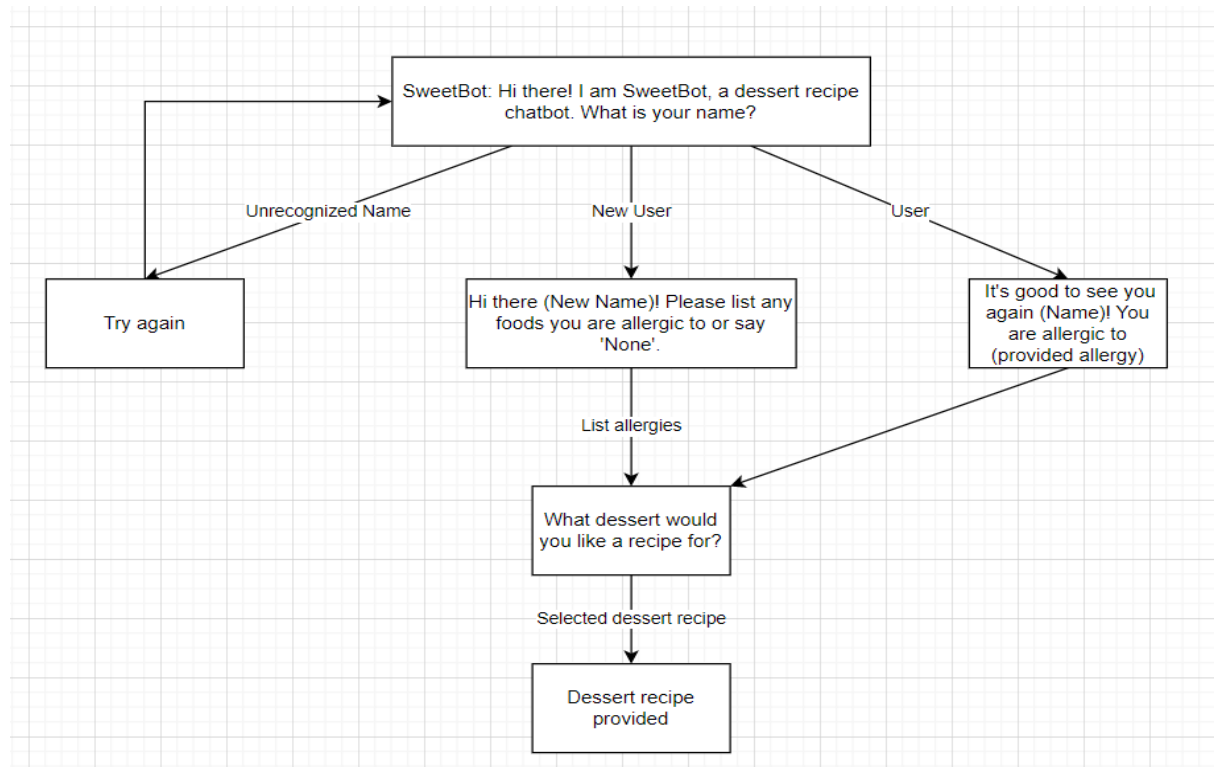
```
pip install -U pip setuptools wheel
pip install -U spacy
python -m spacy download en_core_web_sm
```

```
pip install openai
```

```
pip install nltk
```

3. API Key will be provided through email. You will need to paste it in Line 16

Dialog Logic



Sample Dialog

New User Example:

```
SweetBot: Hi there! I am SweetBot, a dessert recipe chatbot. What is your name?
Robert
SweetBot: Hi there Robert! Please list any foods you are allergic to or say 'None'.
chocolate
SweetBot: What dessert would you like a recipe for?
brownie
SweetBot: Here is a recipe for blondies, a delicious alternative to brownies that don't require chocolate:

Ingredients:
- 1/2 cup unsalted butter, melted
- 1 cup packed brown sugar
- 1 egg
- 1 teaspoon vanilla extract
- 1 cup all-purpose flour
- 1/4 teaspoon baking powder
- 1/4 teaspoon salt

Instructions:
1. Preheat oven to 350°F. Grease an 8-inch square baking pan.
2. In a large mixing bowl, mix together melted butter and brown sugar until well combined. Then, beat in egg and vanilla extract one at a time.
3. In a separate bowl, whisk together flour, baking powder, and salt. Gradually add the dry ingredients to the wet mixture, stirring until well combined.
4. Pour the batter into greased pan and smooth the top with a spatula.
5. Bake for 20-25 minutes or until a toothpick inserted into the center comes out clean.
6. Allow to cool for 10-15 minutes before slicing into squares and serving. Enjoy!
SweetBot: What dessert would you like a recipe for?
```

Existing User Example:

```
SweetBot: Hi there! I am SweetBot, a dessert recipe chatbot. What is your name?
Robert
SweetBot: It's good to see you again, Robert! You are allergic to chocolate, .
SweetBot: What dessert would you like a recipe for?
Brownie
SweetBot: I'm sorry, but brownies are traditionally made with chocolate. I can suggest other dessert recipes without chocolate if you'd like!
SweetBot: What dessert would you like a recipe for?
brownie
SweetBot: As brownies are traditionally made with chocolate, it is difficult to find a recipe without it. However, you could try making blondies, but do not include chocolate. Here's a simple recipe:

Ingredients:
- 1/2 cup unsalted butter, melted
- 1 cup brown sugar
- 1 large egg
- 1 teaspoon vanilla extract
- 1 cup all-purpose flour
- 1/2 teaspoon baking powder
- 1/4 teaspoon baking soda
- 1/2 teaspoon salt

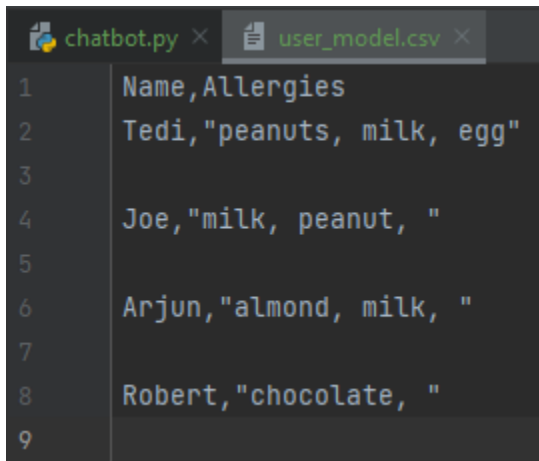
Instructions:
1. Preheat your oven to 350°F.
2. In a large mixing bowl, whisk together the melted butter and brown sugar until smooth.
```

Knowledge Base

For the knowledge base, SweetBot utilizes the live lookup feature of the OpenAI model GPT 3.5-Turbo. As a result, when the user utilizes SweetBot and provides the known user allergies as well as the desired recipe, the SweetBot will request GPT 3.5-Turbo to find a recipe which does not contain the provided allergic food item. The GPT-3.5 Turbo model is trained on billions of tokens and web data up to September 2021.

User Model

The user model found with SweetBot has only two entries. These entries are the name of the individual as well as their recorded allergies. When the user starts the chatbot and provides their name, a new user entry is created within the profile. Similarly, when the user provides their allergy list, a new entry to their profile is added. SweetBot uses these user models in order to save the allergy lists of users who have already used the chatbot prior so that they do not have to re-enter their allergy details when looking for a recipe again. Example of entries provided below.



```
chatbot.py × user_model.csv ×
1 Name,Allergies
2 Tedi,"peanuts, milk, egg"
3
4 Joe,"milk, peanut, "
5
6 Arjun,"almond, milk, "
7
8 Robert,"chocolate, "
9
```

Evaluation

Overall one can see that the chatbot SweetBot is quite effective in what it does. It is able to take users name and allergy list and uses it to recommend dessert recipes the user may be interested in. The SweetBot as a whole is extremely flexible due to the utilization of the live lookup feature from GPT-3.5 Turbo. As a result, SweetBot regardless of user input is able to give valid recipes that best suit the situation. But as a result of this flexibility, minute differences in input result in

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extremely different results. For example, if a user is allergic to chocolate and requests for a brownie recipe. Sometimes SweetBot gives the recipe for a blonde brownie but other times it just says that it is not possible to have a brownie recipe without chocolate. NER does a good job of recognizing names but sometimes uncommon names will not be recognized. NLTK's POS tagger performs a relatively straightforward task and as such it produces fast and accurate results. However misinput from the user can cause it to become inaccurate.