**Jio Institute – Intro to NLP – Fall 2022**

**HOMEWORK PROJECT #2: Parsing for a Conversational Assistant**

The ultimate goal of this project is to build a prototype talking, interactive cookbook. This will require parsing recipe directions (and, in the best case, the ingredients as well).

As discussed in class, the main idea is that the steps of a recipe will be broken out into specific entries into a sequential data structure, e.g., a list. Users can ***read or listen to the contents*** of the current step; ***navigate*** between steps (go forward or backwards); and ***ask questions*** about, e.g., the cooking action(s) specified in the step; the ingredients used; the utensil or tool used; other parameters of the action (usually, time or temperature).

Since most recipe steps specify multiple actions, the first question is how granular to get. Multiple sentences are probably not a good idea; on the other hand, if one sentence is a conjunction of a number of actions, do we really want to break them apart? I would recommend breaking steps at the sentence level, i.e., if a given step includes multiple sentences, they should become separate steps in your system. On the other hand, if one sentence includes multiple steps / actions, probably keep those together.

Something to watch out for here is that while most of the sentences in the directions will be specifying actions (using the imperative form), some will be, e.g., warnings or explanations rather than actions *per se*. I would probably group these with the preceding sentence in a single step.

**Part I**

You will need to parse the sentences at each step. You can use an off-the-shelf parser (e.g., from NLTK, or the Stanford online repository). Or if you want to go simple, you might use regular expressions again or even just keywords.

You will need a lexicon of: cooking actions; utensils / tools; ingredients; something to identify time and temperature specifications. You can put this together by hand or scrape one from an online resource if you find one that's useful.

The result of this phase should be: a data structure such as a list, representing the sequence of steps. You should build this in an object-oriented way with methods (or an API) that let you: query the contents of the current step; return a pointer to the next step or to the previous step; return the cooking action(s), ingredients, utensil(s), or other parameters (time, temperature), if any, associated with the current step.

**Part II**

This will allow you to build a system that, in the very simplest form, allows you to navigate by command ("chatbot" style, or voice) between steps of the recipe.

You should add in the ability to query about the ingredients mentioned in a step, specifically, how much of the ingredient do you need? This should be answered by retrieving the line in the ingredients list of the recipe that refers to that ingredient.

Finally, time permitting, you should add in the ability to query about an action, either its parameters—how hot or for how long a time, which should be retrieved from the parsed parameters—or simply ask, how to do you do that? The latter should search YouTube (using the action, ingredients, etc.) for a "how to" video that demonstrates the method.