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Cognizant AI Externship

## AI-Powered Text Completion Capstone Project

For the Capstone Project: AI-Powered Text Completion, I decided to create a Python Script that accessed OpenAI's API for text completion purposes. Setting up the python script seemed to go smoothly enough, I followed OpenAI's documentation about how to set up a script in Python using their library, and accessed my own API key.

My script works fairly simply. Of course, at the beginning of the script, I need to insert OpenAI from openai's library in python that they have created. With the OpenAI() function now available, I created my client using the API key that I was able to acquire from OpenAI's website. I then printed out a few lines, into the terminal, giving the user an introduction, a way to exit using the model, along with how to edit parameters of the model from the terminal line, including the max\_tokens, temperature, and the top\_p parameters. I then created a while loop which will not break until the user tells the program to exit. This allows the user to make multiple calls to the model during each terminal run. From that point, I run a couple of functions that test the input, one to validate that the prompt is not empty, and the others to validate whether the user has inputted a command that I formatted, one to either exit the model or edit a parameter. I then have the model receive the input from the user, and I print out the response. Finally, once the user does not want to input any more prompts, I print out a thank you and goodbye message before the script concludes running.

### Prompt 1:

The first prompt that I ran through the model was creatively focused. The prompt was "Continue this story: "I got in my car, when all of a sudden """. The parameters used were 0.8 (changed from the default value of 0.7 within my program, along with a max\_tokens default value of 150 and a default top\_p value of 0.3. The output that I received was "I got in my car, when all of a sudden, the engine sputtered and died. I turned the key again, but all I got was a stubborn click. Frustrated, I banged my fist on the steering wheel, the sound echoing in the stillness of the empty parking lot. It was late, and the streetlights cast long shadows across the asphalt.

As I sat there, contemplating my next move, I noticed something out of the corner of my eye. A figure was standing at the edge of the lot, partially obscured by the darkness. My heart raced as I squinted to get a better look. The figure was tall, draped in a long coat that fluttered slightly in the evening breeze." Overall, this response seems extremely relevant and coherent. The story that the model continued made logical sense, and did not seem to be jumping over the place, and the actions taken by the character all were relevant to something happening once the main character ended up getting within their car. There does not seem to be any inaccuracies or biases, it is just telling a story. I am going to edit the parameters used now though, to now be temperature: 1.5, and max\_tokens of 200. Given the exact same prompt, the output was: "I got in my car when all of a sudden, a loud crash echoed through the parking lot. My heart raced as I

turned to see a silver sedan had collided with a nearby lamppost, the sound of metal crunching still ringing in my ears.

I hesitated for a moment, my hand hovering over the ignition key. Should I stay and help? Or was it safer to drive away? The decision was made for me when I saw a figure stumble out of the wrecked car, clutching their side and looking dazed.

Without thinking, I threw my car door open and rushed toward them. "Are you okay?" I called out, my voice shaky with concern. The driver, a young woman with disheveled hair and wide eyes, looked up at me, panic etched across her face.

"I... I don't know," she stammered, her breath coming in quick gasps. "I think I hit my head."

I glanced around, noting that". While the model seemed to be cut off in the middle of the sentence, it still gave a coherent story. Altering the temperature to a higher value did seem to change some parts of the prompt. There is a lot more dialogue, and the situation seems to be a bit "crazier", with someone crashing into a lamppost. Although, even with the story extended and the temperature changed, the response still feels coherent and relevant to the prompt inputted.

## **Prompt 2:**

The second prompt I want to give to the model will be a very subjective question, "Is there a God". People around the world view this question and have completely different answers, whether it be yes or no. People can look at the same pieces of evidence and support both of their extremely different arguments. Using a temperature of 0.4, much more deterministic and factually based, with a top\_p of still 0.3 and max\_tokens of 200, the response was: "The question of whether there is a God is one of the most profound and debated topics in philosophy, theology, and personal belief. Different cultures and religions have various interpretations of God or gods, ranging from monotheism (belief in one God) to polytheism (belief in multiple gods) to atheism (lack of belief in any gods).

Philosophical arguments for the existence of God include the cosmological argument, the teleological argument, and the moral argument, among others. Conversely, arguments against the existence of God often focus on the problem of evil, the existence of suffering, and the lack of empirical evidence.

Ultimately, the answer to this question is deeply personal and can vary widely from individual to individual based on their experiences, upbringing, and reflections. It's a topic that invites exploration and discussion across many disciplines.". Overall, once again, this response was completely coherent and relevant, it stayed centered around the question that I had posed within the original prompt. Along with the change in the temperature parameter, the response does seem to be very unbiased, being extremely factual based and stating different types of beliefs that can be found all over the world, not taking either side of the argument. Editing the temperature, I wonder if the response will seem a little bit more out there, or whether or not a

bias seems to become evident. With a temperature parameter of 1.8, with the other two remaining unchanged, the response with the same prompt that I received was: "The question of whether there is a God is one of the most profound and debated topics in philosophy, theology, and personal belief. Different cultures, religions, and individuals have various interpretations and beliefs regarding the existence of God or gods."

Some people find evidence of a higher power in religious texts, personal experiences, or the complexity of the universe. Others may adopt atheism or agnosticism, believing that there is insufficient evidence to support the existence of a deity or that the existence of God is unknowable.

Ultimately, the answer to this question is deeply personal and can vary widely from one person to another. It often involves a combination of faith, personal experience, philosophical reasoning, and cultural influences." While the change in the temperature variable did not seem to affect much but wording, here is an attempt with a middling temperature (0.7), and a top\_p value of 0.7, with the result being: "The question of whether there is a God is one of the most profound and debated topics in philosophy, theology, and personal belief. Different cultures, religions, and individuals have varying beliefs about the existence of God or gods."

Theistic perspectives, such as those found in Christianity, Islam, and Judaism, affirm the existence of a singular, personal God. Other religions, like Hinduism, may embrace a more polytheistic view or consider the divine as an abstract, impersonal force.

Atheism, on the other hand, is the lack of belief in any gods, while agnosticism holds that the existence of God is unknown or unknowable.

Ultimately, the answer to this question often depends on personal experiences, cultural background, and philosophical reasoning. It's a deeply individual matter, and people arrive at different conclusions based on their own reflections and insights." The top\_p seemed to have included specific religions, which could be due to the fact that a larger top\_p value seems to look over more information than a smaller one. Although, even with temperature change, no bias or inaccuracy appeared, and all responses were relevant and coherent.

### **Prompt 3:**

The third prompt that I gave to the model was informational. I am taking a book, in this case The Hunger Games and asking the model to summarize it in 150 tokens. With a temperature value of 0.7 and a top\_p value of 0.3, the result I received was: ""The Hunger Games," a novel by Suzanne Collins, is set in a dystopian future where the totalitarian nation of Panem is divided into 12 districts, each controlled by the Capitol. To maintain control and instill fear, the Capitol hosts an annual event called the Hunger Games, where one boy and one girl, known as "tributes," are selected from each district to compete in a televised fight to the death.

The story follows Katniss Everdeen, a 16-year-old girl from District 12, who volunteers to take her sister Prim's place in the Games. Alongside Peeta Mellark, the male tribute from her district,

Katniss navigates the brutal competition, forming alliances and facing moral dilemmas. As the” All information given by the model is factual, with no inaccuracies, and the response is coherent, understandable even by those unfamiliar with the series, and the response is still very relevant to the prompt that was inputted. However, I want to edit the temperature parameter to 1.9 and the top\_p value to 0.9, to see how creative the response will get and whether or not any inaccuracies are present within the response. Upping the max\_tokens parameter to 250 to see if the model goes off the deep end, my response is: “”The Hunger Games,” written by Suzanne Collins, is set in a dystopian future in the nation of Panem, where the Capitol exerts control over twelve districts. Each year, as punishment for a past rebellion, the Capitol holds the Hunger Games, a televised event in which one boy and one girl, known as “tributes,” are selected from each district to compete in a brutal fight to the death.

The story follows Katniss Everdeen, a 16-year-old girl from District 12, who volunteers to take her sister Prim's place in the Games. Alongside Peeta Mellark, the male tribute from her district, Katniss faces numerous challenges as they navigate the deadly arena and the complexities of survival, loyalty, and sacrifice. Throughout the Games, Katniss becomes a symbol of hope and rebellion against the oppressive Capitol, sparking a larger resistance movement.

Themes of survival, class struggle, and the impact of media are prevalent throughout the narrative. The book explores the moral dilemmas faced by the characters as they confront violence and exploitation in their fight for survival.” Even with the changed parameters, no inaccuracies are found, and the response is still relevant and coherent, still able to be understood by those who are not familiar with The Hunger Games trilogy.

#### **Prompt 4:**

The next two prompts I really wanted to have it be instructional, to test parameters and see whether or not they affect the legitimacy of the outputs given by the model. The first prompt I gave was: “Explain photosynthesis to me like you are Yoda teaching a Jedi youngling.” With default temperature and top\_p, with a max\_tokens of 250, the response given was: “Hmm, young one, listen closely, you must. Photosynthesis, a powerful process it is.

In the green leaves of plants, the magic happens. Sunlight, they capture, yes. Energy from the sun, they harness. With the help of water, drawn from the ground, and carbon dioxide, taken from the air, they create food.

Chlorophyll, the green pigment, it is. Absorbs the sunlight, it does. Transforming light into energy, it helps.

In this process, oxygen, a gift to us, they release. Breathe it in, we do.

So, remember, young Jedi: plants, they are not just still. They are busy, creating life, connecting all living things. A balance, they maintain. Strong in the Force, they are.

Understand this, you must, for nature's wisdom, a part of the Jedi way it is." Even while sounding like Yoda (as confusing as that may be), the response given by the model is still accurate to how photosynthesis does work in our world. It does not go into too much detail and is not extremely deterministic, but still can be followed, and understood. Now, editing the temperature and top\_p to 1.8 and 0.85 respectively, the response given is: "Hmm, youngling, listen well you must. Photosynthesis, a process of life it is. In plants, it occurs, yes.

With sunlight, the magic begins. Leaves, they gather light, energy from the sun, strong they are. Chlorophyll, green pigment in leaves, capture the light, it does.

Air, the plants also need. Carbon dioxide, they breathe in from the atmosphere. A gift from the Force, it is, yes.

Water, important too. From roots, drawn from the soil, it is. Together, these elements combine. Light, carbon dioxide, and water, the recipe for life!

In a powerful reaction, they transform. Glucose, a type of sugar, produced it is. Food for the plant, energy to grow strong. Oxygen, a byproduct released, shared with all living beings. A breath of life, it becomes.

Balance in nature, photosynthesis brings. A cycle of energy and sustenance, forever it continues. Remember, youngling, in all things, the Force flows. Nurture it, and harmony you will find." From what I can tell, this piece seems to go into even more detail. I feel that this is caused by an increase in temperature and top\_p. More information is able to be looked over by the model when formulating its response, and more is given, like glucose being mentioned, and the fact that oxygen is a byproduct of the photosynthesis reaction. Still, no inaccuracies are found within the response, and the response is coherent and relevant.

#### **Prompt 5:**

This prompt will be like the last prompt inputted into the model, being an instructional prompt. This time, I will be asking the model to explain python dictionaries like I am an 8th grader just learning how to code for the very first time. The temperature will be 0.2 to start off, and top\_p will remain the same at the default 0.3, and max\_tokens will be 250. The response given by the model was: "Sure! Imagine you have a box where you keep your favorite things, like toys, books, or games. Now, instead of just throwing everything in the box randomly, you want to organize it so you can find things easily.

In Python, a dictionary is like that organized box. It helps you store information in pairs, where each piece of information has a name (called a "key") and a value (the actual information you want to store).

### Here's how it works:

1. **Keys and Values**: Think of the key as a label on a box, and the value as what's inside that box. For example, if you have a box labeled "Favorite Color" (the key), inside you might have "Blue" (the value).

2. **Creating a Dictionary**: You can create a dictionary in Python using curly braces `{}`. Here's an example:

```
```python
my_favorites = {
    "color": "blue",
    "food": "pizza",
    "animal": "dog"
}
```
```

In this example, `my\_favorites` is a dictionary that has three keys: "color", "food", and "animal". The values are "" While being cut off yet again within the middle of a response, the response is once again relevant and understandable. No inaccuracies are found, as the code provided by the model would create a python dictionary. Now, I will edit the prompt to have a temperature of 1.95, with the same top\_p and max\_tokens values. The output given by the model is: "Sure! Imagine you have a box where you keep your favorite things, like toys, books, and games. Now, instead of just throwing everything in the box, you want to organize it so you can find things easily."

In Python, a dictionary is like that organized box. It helps you store information in pairs, where each piece of information has a name (called a "key") and a value (the actual information you want to store).

### Here's how it works:

1. **Keys and Values**: Think of the keys as labels for your items. For example, if you have a toy car, the key could be "toy\_car" and the value could be "red race car." So, in a dictionary, you would write it like this:

```
```python
my_toys = {
    "toy_car": "red race car",
    "stuffed_animal": "teddy bear",
    "board_game": "Monopoly"
}
```
```

2. **Accessing Values**: If you want to find out what your toy car is, you can use the key to get the value. You would do it like this:

```
```python
```

`print(my_toys["` The response given by the model seems quite similar to the previous response given at a much lower temperature, but later on in the instructions phase the output begins to differ. The response with a higher temperature value gives more instructions and how to access values, while the more deterministic response seemed to go slower, going more in depth on the creation and values aspect, instead of how to access them within code. Once again, both responses are coherent and relevant to the prompt that I inputted into the model.

**Conclusion:**

Honestly, my model seems to perform well at all different parameters, no matter the type of prompt that is inputted, or the value of the parameters. While the outputs do differ, they do not structurally or logistically fall apart, they all remain relevant, coherent, and accurate to the user of the model. The model does not seem to struggle in any particular aspect, except for cutting off when the `max_tokens` is reached. There were a couple of prompts that ended up receiving incomplete responses due to the `max_tokens` parameter. I would say that the best way to be able to improve upon this model would be to use the `max_tokens` parameter to format the answer, and output a response catered to that value so that a complete answer is provided to the best of the model's ability (logically, obviously a value of 1 would not provide any coherent or relevant response).