

Danny Mendler

GenAI Externship

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### GenAI Capstone Project

**Prompt 1:** “what is the capital of Pennsylvania?”

**Response 1:** “The capital of Pennsylvania is Harrisburg. It is located in the south-central part of the state along the Susquehanna River. Harrisburg serves as the seat of Dauphin County and is the ninth-most populous city in Pennsylvania. It is also home to the Pennsylvania State Capitol, which houses the state government.”

**Settings:** temperature = 0.1, max\_tokens = 100

**Reflection:** This is the kind of response I expect from a current genAI model when asking a question. It gives you the answer you desire plus some additional information about the response.

**Prompt 2:** “what is the capital of Pennsylvania?”

**Response 2:** “The capital of Pennsylvania is **Harrisburg**. It is located in the south-central part of the state along the Susquehanna River. Harrisburg serves as the seat of government for the Commonwealth of Pennsylvania and is home to the Pennsylvania State Capitol building.”

**Settings:** temperature = 0.9, max\_tokens = 100

**Reflection:** I expected this response to be more “creative” since the temperature was higher; however, I received a more simplified response to the same prompt with a lower temperature.

**Prompt 3:** “summarize what python is”

**Response 3:** “Python is a high-level, interpreted, general-purpose programming language known for its simplicity, readability, and versatility. Created by Guido van Rossum and first released in 1991, Python emphasizes code readability with its clear syntax and indentation-based structure. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming.

Key features of Python include:

1. **\*\*Easy to Learn\*\***: Its straightforward syntax makes it accessible for beginners.
2. **\*\*Versatile\*\***: Used for web development, data analysis, artificial intelligence, scientific computing, automation, and more.
3. **\*\*Extensive Libraries\*\***: A large standard library and third-party packages (e.g., NumPy, Pandas, Django, TensorFlow) simplify complex tasks.
4. **\*\*Cross-Platform\*\***: Runs on Windows, macOS, Linux, and other operating systems.
5. **\*\*Community-Driven\*\***: Supported by a large, active community contributing to its growth and resources.

Python's popularity stems from its ability to handle diverse tasks efficiently, making it a preferred choice for developers, data scientists, and researchers worldwide."

**Settings:** temperature = 0.5, max\_tokens = n/a

**Reflection:** This response was very informative and accurate on what Python is as a coding language. It includes terms like "object-oriented", "interpreted", and "indentation-based structure". However, it mentioned nothing about being open-sourced, which is another key part of Python, which I was expecting.

**Prompt 4:** "finish this story: The rain tapped softly against the windowpane as Danny unfolded the yellowed letter he'd found tucked inside his grandmother's old diary. The handwriting was shaky but urgent, whispering secrets that had lain buried for decades. Outside, the wind howled—as if the past itself had stirred."

**Response 4:** "Danny's fingers trembled as he read the words, his breath catching in his throat. The letter spoke of a hidden treasure, not of gold or jewels, but of something far more precious—a lost family legacy. His grandmother, it seemed, had been part of a secret society that guarded an ancient artifact, said to hold the power to heal or destroy, depending on who wielded it. The artifact had been hidden during the chaos of World War II, its location known only to a select few. The letter ended with a cryptic clue:

"Where the roots of the old oak embrace the earth, seek the heart that beats beneath."\*

Danny glanced out the window, where the rain had turned torrential. The wind rattled the shutters, as if urging him to act. He knew the old oak—it stood in the center of the family

estate, its gnarled branches reaching skyward like a sentinel of time. his grandmother had often sat beneath it, lost in thought, but Danny had never imagined it held such a secret.

Grabbing his coat and a flashlight, he stepped into the storm. The path to the oak was muddy and treacherous, but he pressed on, the letter clutched tightly in his hand. When he reached the tree, he knelt in the damp soil, his fingers brushing against the roots. The clue had spoken of the "heart that beats beneath"—but what did that mean?

As he dug carefully, his flashlight beam caught something metallic. his heart raced as he uncovered a small, ornate box, its surface etched with symbols he didn't recognize. With trembling hands, he opened it. Inside lay a pendant, its center stone glowing faintly, as if alive. The artifact.

Suddenly, the wind stilled, and the rain seemed to pause, as if the world itself held its breath. Danny felt a strange warmth emanate from the pendant, a connection to something ancient and profound. He closed his eyes, the weight of his discovery settling over him. The past had chosen him as its guardian, and with it came a responsibility he couldn't yet fully comprehend.

As he stood, the storm resumed, but Danny felt a strange calm. The secrets of the letter, the artifact, and his grandmother's legacy were now his to protect—and perhaps, one

day, to share. The rain tapped softly against the windowpane once more, but this time, it felt like a promise rather than a warning. The past had stirred, and Danny was ready to listen.”

**Settings:** temperature = n/a, max\_tokens = n/a

**Reflection:** The response provided an interesting short story about Danny and a short adventure he went on. A very interesting and impressive response.

**Prompt 5:** “summarize: Generative AI is a type of artificial intelligence that creates new content, such as text, images, music, or videos, based on patterns it has learned from existing data. Definition: Generative AI creates new content, such as text, images, music, or videos, by learning patterns from existing data. Purpose: Unlike traditional AI that analyzes or predicts, generative AI focuses on creating original outputs. Capabilities: It can write stories, generate artwork, compose music, and produce realistic visuals or videos. Impact: Transforms creativity and automation, enabling personalized and innovative content generation across industries. Applications: Used in entertainment, marketing, design, and more to streamline creative processes.”

**Response 5:** “Generative AI is a form of artificial intelligence that creates new content—such as text, images, music, or videos—by learning patterns from existing data. Unlike traditional AI, which focuses on analysis or prediction, generative AI specializes in producing original outputs. Its capabilities include writing stories, generating artwork, composing music, and creating realistic visuals or videos. This technology transforms creativity and automation, enabling personalized and innovative

content generation across industries like entertainment, marketing, and design, while streamlining creative processes.”

**Settings:** temperature = n/a, max\_tokens = n/a

**Reflection:** This is a perfect summary of the text that was imputed (from “Overview: Introduction to Generative AI” in Modules). It summarized all the main points in a shorter, more condensed manner.

**Prompt 6:** “explain recursion like I am 5”

**Response 6:** “Okay! Imagine you have a big tower made of blocks, and you want to take it apart, one block at a time. But there’s a rule: you can only take off the **top block** first. Once you do that, you have a slightly smaller tower, right? So, you do the same thing again: take off the **new top block**. You keep doing this until there are no more blocks left.

**Recursion** is like that! It’s when you solve a big problem by breaking it into smaller, similar problems, and solving those first. Each time, you repeat the same rule until there’s nothing left to solve. It’s like saying, “I’ll do this one step, and then I’ll ask myself to do the same thing again with what’s left!”

For example, if you have a staircase and want to climb it, you take one step, then say, “Now I”

**Settings:** temperature = 0.7, max\_tokens = 200

**Reflection:** The description of recursion is accurate and informative. It simplifies the response so a five year old can understand it. However, I expected the response to be contained into 200 tokens, instead of being cut off at 200.

### **Reflection of Limitations:**

The model performs well when answering factual or well-established questions, such as identifying state capitals or summarizing widely known topics like Python or Generative AI. It also excels at generating structured, creative content (as seen in the story continuation for the character Danny).

However, it had trouble adjusting to different temperatures, providing an over-simplified response when a more creative answer was expected, as seen when increasing the temperature did not change the tone or detail of the state capital answer. It may also omit key points that a knowledgeable user might expect, like leaving out the open-source nature of Python. Additionally, when constrained by token limits, the model may cut off its response without a natural conclusion, as seen in the recursion explanation.

To improve the application, implementing output filtering to remove incomplete or irrelevant responses and using fact-checking tools to validate the generated response may help in providing clearer and more accurate results. Also combining generative output with proper reference material may improve the accuracy and completeness of the responses.