Fundamentals of AI Models and Prompt Interpretation

Objective:

This report explores how generative AI models interpret prompts and how different model parameters (temperature, tokens, and stop sequences) influence output. Additionally, it compares open-ended vs. specific prompts and fine-tunes responses for customer support and different content types.

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1. Experimentation with Model Parameters

(A) Temperature Experimentation

Prompt Used:

"Write a short story about a lost traveler who discovers a hidden city."

Results:

- **Temperature 0.2:**
  - Output was highly deterministic, logical, and repetitive.
  - Limited creativity; structured but lacked unexpected elements.
- **Temperature 0.5:**
  - Balanced between coherence and creativity.
  - More variation in sentence structure and ideas.
- **Temperature 0.8:**
  - Highly unpredictable, with creative and unexpected story elements.
  - Some sentences felt disjointed due to the randomness.

Analysis:

Lower temperature (0.2) ensures factual, structured content, while higher values (0.8) encourage creativity at the cost of coherence. Medium temperature (0.5) is ideal for most tasks requiring a balance of both.

(B) Token Limit Experimentation

Prompt Used:

"Explain the concept of quantum entanglement in simple terms."

Results:

- **100 Tokens:**
  - Very brief explanation with minimal detail.
  - Provided a one-sentence definition without examples.
- **250 Tokens:**
  - Covered basic principles with simple analogies.
  - Explained entanglement in relation to particles but lacked depth.
- **500 Tokens:**
  - Detailed explanation with examples (e.g., Einstein's "spooky action at a distance").
  - Included use cases and implications.

Analysis:

Shorter token limits restrict depth, whereas larger limits allow comprehensive explanations. Adjusting tokens ensures responses match the intended level of detail.

(C) Stop Sequence Experimentation

Prompt Used:

"Describe the process of photosynthesis in a structured manner."

Results:

- **Stopping after a sentence:**
  - The response was incomplete, cutting off important details.
- **Stopping after a paragraph:**
  - Provided an overview but lacked in-depth explanations.
- **Stopping after a section header:**
  - Allowed for structured segmentation, ensuring clarity.

Analysis:

Stop sequences control response format and readability. Using strategic stop points helps ensure clarity in technical and structured content.

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2. Open-ended vs. Specific Prompts

(A) Creative Writing

- **Open-ended Prompt:** *"Write a story about an adventurous journey."*

    - The response was broad, generic, and required additional context.
- **Specific Prompt:** *"Write a 200-word story about a scientist who discovers time travel in the year 2045, focusing on the moral dilemmas of time manipulation."*
    - The response was detailed, structured, and aligned with the given constraints.

Analysis:

Specific prompts yield targeted, high-quality outputs, while open-ended ones require more refinement.

(B) Technical Writing

- **Open-ended Prompt:** *"Explain how a neural network works."*
    - The response varied in depth, requiring manual clarification.
- **Specific Prompt:** *"Provide a step-by-step explanation of how backpropagation optimizes a neural network, using a simple example with two hidden layers."*
    - The response was structured and in-depth.

Analysis:

Specificity improves output relevance, reducing ambiguity.

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3. Customized Customer Support Response

Scenario:

A customer contacts support about a delayed delivery.

Prompt Used:

“A customer contacts support regarding a delayed delivery. Write a polite, empathetic, and professional response apologizing for the delay, explaining possible reasons, and reassuring the customer about the next steps. Keep the response within 150-200 words. Avoid overly casual language and irrelevant details.”

Generated Response:

Dear [Customer's Name],

We sincerely apologize for the delay in delivering your order. We understand how important it is to receive your purchase on time, and we regret any inconvenience caused.

Due to unforeseen logistical issues, there has been a slight delay in the shipment process. However, we are actively working with our partners to expedite your delivery. Your order is now expected to arrive within the next 2-3 business days.

We appreciate your patience and understanding. If you need any further assistance, please do not hesitate to contact us. Thank you for choosing our service!

Best regards,
[Support Team]

Adjustments & Model Parameters:

- **Temperature:** 0.3 (ensured professionalism)
- **Token Limit:** 200 (kept response concise)
- **Stop Sequence:** Ended after a polite closing statement

Analysis:

Applying constraints ensured a structured, polite, and helpful response. Lower temperature maintained coherence.

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4. Fine-tuned Prompts for Content Types

(A) Creative Writing

1. **Poem Prompt:** *"Write a rhyming poem about the beauty of the night sky, capturing its serenity and mystery."*
2. **Dialogue Prompt:** *"Write a conversation between a detective and a suspect, where the detective is trying to extract a confession without revealing key evidence."*

(B) Technical Writing

1. **Scientific Concept Explanation:** *"Explain how machine learning models classify images, covering feature extraction, training, and prediction in simple terms."*
2. **Programming Tutorial:** *"Write a beginner-friendly tutorial on implementing a binary search algorithm in Python, including step-by-step explanations and code examples."*

Analysis:

- Creative prompts used vivid descriptions and emotional depth.
- Technical prompts focused on clarity, structure, and accuracy.
- Adjusting length and specificity guided AI for better output.

Conclusion:

This assignment demonstrated how modifying parameters and refining prompts can significantly impact AI-generated responses. Specific prompts and controlled model

constraints improve relevance, coherence, and usability. Fine-tuning these aspects ensures optimal outputs for diverse applications in AI-based content generation.

i did task 2,4 in this chat
https://chatgpt.com/share/67dc3a38-24f0-800e-85d4-5442e4cc2ebe
i did all experimentation in google ai studio task 1, 3
https://aistudio.google.com/app/prompts?state=%7B%22ids%22:%5B%221nilN_TaPkVlPAIBa5XptEzqTKGQvg7fc%22%5D,%22action%22:%22open%22,%22userId%22:%221156405118741635690755%22,%22resourceKeys%22:%7B%7D%7D&usp=sharing