Exploring Prompt Styles for Sentiment Analysis

This document explores how different prompt styles influence a language model's performance on a sentiment analysis task. The goal is to understand how to get more reliable outputs by changing how the model is asked to perform the task.

Example Used

Movie review:

"The special effects were amazing, but the plot was confusing."

This sentence has both positive and negative elements. How we prompt the model can affect how it interprets this.

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1. Zero-Shot (Direct) Prompt

Prompt:

> *What is the sentiment of this movie review: "The special effects were amazing, but the plot was confusing"? Answer with Positive, Negative, or Neutral.*

Output:

Neutral or Mixed — because the sentence includes both praise and criticism.

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2. Few-Shot Prompt

Prompt:

> *Classify the sentiment of the third movie review. Use the two examples provided:*
>
> - *Review: "This movie was a waste of time."*
> *Sentiment: Negative*
> - *Review: "I couldn't stop laughing throughout the film!"*
> *Sentiment: Positive*
> - *Review: "The special effects were amazing, but the plot was confusing."*
> *Sentiment:*

Output:

Mixed

Few-shot prompting provides context and helps the model learn the format and reasoning better.

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3. Chain-of-Thought Prompt

Prompt:

> *Analyze the following review step by step and determine its sentiment:*
>
> *"The special effects were amazing, but the plot was confusing."*
>
> *Step 1: Identify positive aspects*
> *Step 2: Identify negative aspects*
> *Step 3: Decide the overall sentiment*

Output:

- Step 1: The special effects were amazing (positive)
- Step 2: The plot was confusing (negative)
- Step 3: Mixed sentiment

This approach encourages the model to think step-by-step, often improving reasoning.

Improving Prompt Quality

A vague prompt like:

> *What is the sentiment of this review?*

Can lead to inconsistent results.

Improved Prompt:

> *Read the following customer review and classify its sentiment as Positive, Negative, or Neutral. If both positive and negative elements are present, answer Mixed.*
>
> *Review: "The special effects were amazing, but the plot was confusing."*

Why it’s better:

- **Clarity**: It clearly defines the task.
- **Specificity**: The possible answers are defined.
- **Context**: Instructions are given for mixed sentiment.

Further improvements might include:

- Adding examples (few-shot)
- Mentioning the target audience
- Asking for step-by-step reasoning (chain-of-thought)

Ethical Considerations with LLMs

Bias

Models can unintentionally reinforce societal or cultural biases. This can impact fairness in applications like hiring or lending.

Fairness

It's critical to treat all users and groups equitably. Involving diverse voices and tracking fairness metrics helps mitigate this.

Privacy

Large models can sometimes memorize and reproduce sensitive data. Using anonymized data and following good privacy practices is key.

Ethical Issues Summary

Issue	Description	Mitigation
Bias	Models may repeat stereotypes or unfair patterns.	Use diverse training data, audit models, ensure transparency.
Fairness	Avoid disadvantaging any group.	Include stakeholders, measure fairness, conduct regular reviews.
Privacy	Sensitive data might leak from outputs.	Anonymize data, limit collection, follow privacy laws.

Conclusion

The way you prompt an LLM can significantly impact its performance on tasks like sentiment analysis. Clear, specific, and contextual prompts improve results. At the same time, developers must remain mindful of ethical risks to ensure fairness, safety, and trust in AI systems.

□ References

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