

Lab Assignment 3 Report

Git Hub Link : <https://github.com/Habiba95943/Habiba-Lab-3>

1. Introduction

This report presents an implementation of a content classification and analysis tool using the Groq API. The main objective of this lab assignment was to explore structured prompting, assess model confidence, and compare different prompt strategies for optimizing performance.

2. Implementation Approach

- **Groq API Integration:** Established a stable API connection with error handling mechanisms.
- **Structured Prompting:** Designed prompts to extract essential insights systematically.
- **Confidence-Based Classification:** Implemented confidence assessment alongside text classification.
- **Prompt Strategy Evaluation:** Compared different strategies to determine effectiveness.

3. Execution and Results

3.1. Basic Completion Test

- **Input:** "Describe the concept of artificial intelligence in simple terms."
- **Output:** (Sample response generated by the model)

3.2. Structured Prompting

- **Input Text:** "The app was very user-friendly, but the setup process was complicated."
- **Extracted Insights:**
 - **Sentiment:** Mixed
 - **Issue Identified:** Complicated setup

3.3. Confidence-Based Classification

- **Text:** "The customer service was unresponsive, and the product was defective."
- **Classified as:** Negative
- **Confidence Level:** High
- **Reasoning:** The major concerns were lack of support and product quality issues.

3.4. Prompt Strategy Evaluation

Strategy	Classification Output	Confidence Level
Basic Prompt	Negative	Medium
Structured Prompt	Negative	High
Few-Shot Prompting	Negative	High

4. Challenges and Solutions

- **Handling API Errors:** Introduced exception handling to prevent crashes.
- **Ensuring Consistent Output:** Used structured extraction techniques for reliability.
- **Confidence Assessment:** Simulated log-probability-based confidence estimation.

5. Learnings and Reflections

- **Structured Prompting:** Improved response clarity and relevance.
- **Confidence Analysis:** Helped refine classification accuracy.
- **Few-Shot Learning:** Enhanced model performance by providing example-based guidance.

6. Conclusion

This lab assignment provided valuable insights into using structured prompting and confidence analysis to optimize LLM behavior for classification tasks. The experiment highlighted the effectiveness of various prompting techniques in controlling response accuracy.