

Project Proposal: Customer Insight Analyzer

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Objective: The objective of the Customer Insight Analyzer project is to design and develop an advanced NLP application tailored to extract actionable insights from Amazon customer reviews. Leveraging state-of-the-art AI and LLMs, this application aims to provide businesses with deep analysis of customer sentiments, trends, and engagement, enabling informed decision-making for product development, marketing strategies, and customer service enhancements.

Use Case Selection: The project focuses on analyzing Amazon customer reviews to extract valuable insights that can drive business decisions. By understanding customer sentiments and preferences, businesses can improve their products, marketing strategies, and customer service, ultimately leading to increased customer satisfaction and loyalty.

Model and Technology Integration:

- Utilize pre-trained LLMs such as BERT and GPT from Hugging Face for various NLP tasks, including sentiment analysis, thematic extraction, and language understanding.
- Develop custom NLP models for sentiment analysis and thematic extraction, fine-tuned on domain-specific data.
- Implement Lang Chain to enhance processing capabilities for complex NLP tasks and improve the accuracy of thematic extraction.
- Use Named Entity Recognition (NER) and relation extraction techniques to extract entities and relationships from customer reviews.

API Development:

- Develop a robust API using FastAPI to handle data ingestion, processing, and generation of actionable insights.
- Implement comprehensive endpoint documentation, request validation, and error handling to ensure the reliability and usability of the API.
- Design a user-friendly interface for uploading data, configuring analysis parameters, and accessing generated insights and visualizations.

Data Input Methods:

- Support bulk upload of datasets containing Amazon customer reviews in CSV or JSON format.
- Enable interactive input for single reviews, allowing users to input individual feedback in real-time or perform ad-hoc analyses without pre-existing datasets.

Containerization and Deployment:

- Dockerize the application to ensure all dependencies are neatly packaged and easily deployable across different environments.
- Deploy the Dockerized application on cloud platforms such as Google Cloud or AWS to leverage scalability and reliability features.

Monitoring with LangSmith:

- Integrate LangSmith for real-time monitoring of the application's operational metrics and model behavior.
- Set up necessary logs and alerts to ensure proactive management of the application's health and performance.

Project Documentation:

- Create detailed documentation covering setup instructions, API usage, and deployment steps.
- Document challenges, solutions, and key learnings in a final project report to provide insights for future iterations.

Expected Benefits: The Customer Insight Analyzer will enable businesses to gain actionable insights from Amazon customer reviews, allowing them to make informed decisions for product improvements, targeted marketing campaigns, and enhanced customer service. By leveraging advanced AI and LLMs, businesses can achieve greater customer satisfaction, loyalty, and revenue growth.

Dataset Link: <https://huggingface.co/datasets/McAuley-Lab/Amazon-Reviews-2023>