BI Chatbot: Prompt Mapping and Architecture

Prompt Mapping

The BI chatbot processes user queries in English, Mandarin, and Cantonese to provide insights from Google Analytics data. The prompt mapping process ensures accurate and multilingual responses:

- Query Input: Users enter questions through a React frontend, such as "What was the bounce rate on July 15, 2025?" or "2025年會話數同頁面瀏覽量嘅趨勢係點？" (Show the trend of sessions and pageviews in 2025).
- Translation: Non-English queries are translated to English using the deep-translator library (GoogleTranslator) for processing by the language model.
- LLM Processing: Queries are handled by a LangChain-integrated LLaMA 3.1 model (via OpenRouter). A prompt template includes a summary of mock Google Analytics data (365 days, 2025) to guide responses.
- Data Access: The system queries a mock dataset (mock_ga_data.csv) containing metrics like sessions, users, pageviews, bounce rate, event count, and session duration.
- Chart Generation: Trend queries (e.g., "Show sessions trend") trigger Plotly line charts, generated using pandas and plotly.express for visualization.
- Response Output: Answers are translated back to the user's language, include a follow-up question (e.g., "Would you like to see the trend over time?"), and provide charts for trend queries.

This process ensures seamless handling of multilingual queries, delivering clear insights and visualizations tailored to non-technical SME owners in Asia.

Architecture

The BI chatbot is built as a modular, full-stack application with the following components:

- Backend (FastAPI): A Python-based FastAPI server manages API requests at /query. It loads mock_ga_data.csv, processes queries using LangChain, and generates Plotly charts for trends.
- Frontend (React): A React interface displays a chat window and renders Plotly charts using react-plotly.js. It communicates with the backend via HTTP POST requests.
- Data Layer: Mock Google Analytics data (mock_ga_data.csv) provides 365 days of 2025 data, including columns like date, sessions, bounce_rate, and eventCount.
- Translation Layer: The deep-translator library enables multilingual support, translating queries and responses between English, Mandarin (zh-cn), and Cantonese (zh-hk).
- Deliverables: The system produces a multilingual summary report (summary_report.json) with metrics like total sessions and average bounce rate, screenshots of query responses, and a GitHub repository with a .gitignore to exclude sensitive files (.env, venv/).

The architecture ensures scalability, with the potential to integrate real Google Analytics Data API (v1) for live GA4 data. A simple data flow is: User → React Frontend → FastAPI Backend → LLM & Mock Data → Translated Response & Charts.

This design delivers an intuitive, multilingual BI tool for SME owners, with robust data processing and visualization capabilities.