AI-Powered Conversation Analytics Dashboard

Project Proposal

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Reason

Businesses such as hotels and restaurants rely heavily on phone conversations to interact with their customers. Increasingly, AI-powered receptionists are handling these calls, automating tasks like taking reservations or answering frequently asked questions. While this reduces operational costs, companies still lack visibility into *what exactly happens during these calls*. Without proper analysis, valuable insights about customer behavior, needs, and recurring issues remain hidden in raw transcripts.

An AI-powered dashboard that analyzes these phone call transcripts can bridge this gap, providing actionable intelligence in real time and empowering businesses to make data-driven decisions.

Objective

The project aims to build a dashboard that enables companies to:

1. Query call transcripts in natural language and receive clear, data-driven insights.

2. Track key call metrics (e.g., duration, frequency, common requests, keyword trends).

3. Surface recurring customer questions and patterns to improve operations.

4. Provide a foundation for advanced business analytics without requiring technical expertise.

Use Cases

- **Operational Monitoring**

  o "How many calls did we have yesterday?"

  o "What was the average call duration last week?"

- **Customer Insights**

  o "What was the most frequently asked question this month?"

  o "How many customers asked about parking availability between Jan 1 and Jan 15?"

- **Performance Tracking**

  o "Which day last week had the highest call volume?"

  o "What percentage of calls resulted in a successful booking?"

- **Quality & Trend Analysis**

  o "Which keywords were mentioned most often today?"

  o "Show me recurring complaints in the past month."

Potential for Expanding

Beyond the MVP, the project could evolve into a comprehensive conversation intelligence platform with features such as:

- **Sentiment Analysis** – Measure customer satisfaction and detect frustration during calls.

- **Topic Clustering** – Automatically group conversations by theme (e.g., reservations, cancellations, complaints).

- **Comparative Analytics** – Benchmark performance across branches, time periods, or receptionist AI models.

- **Predictive Insights** – Identify emerging customer needs or predict peak call times.

- **Integration with CRM** – Enrich customer profiles with call insights for personalized service.

- **Voice Tone Analysis** – Detect sentiment shifts from speech patterns, not just transcripts.

- **Data visualization**, such as charts and tables summarizing call data.

Result (Minimum Viable Product)

The MVP will consist of:

- A simple **dashboard interface**.

- An **AI-powered query system** that allows natural language questions about the transcripts.

- **Core analytics features**, including:

    o Call count by date range

    o Average call duration

    o Most frequent keywords

    o Most common customer questions

This will deliver immediate understanding to the business value by allowing companies to quickly understand call dynamics and customer concerns without manually reviewing transcripts.

Expected Technical Aspects

At this stage, the technical design is exploratory, but the solution will likely combine modern AI and data infrastructure to deliver reliable insights:

- **Data Storage & Processing**

    - Transcripts could be stored in a structured database with associated metadata (e.g., call duration, timestamps).

    - Preprocessing may include text cleaning, keyword extraction, and embeddings for semantic search.

- **Retrieval-Augmented Generation (RAG)**

    - A vector database might be used to store transcript embeddings.

    - When a user asks a question, relevant transcript segments would be retrieved and passed to a language model, ensuring responses are grounded in the actual data.

- **Natural Language Querying**

    - A large language model (LLM) is expected to power the conversational interface, translating user questions into structured queries and summarizing results.

Learning Outcomes

Learning Outcome 1: Societal Impact
This project explores how AI can help businesses gain insights while also considering privacy, transparency, and responsible use of customer conversation data.

Learning Outcome 2: Investigative Problem Solving
By defining the problem of "hidden insights in AI receptionist calls," the project requires analyzing challenges (e.g., messy transcripts, vague queries) and designing appropriate solutions.

Learning Outcome 3: Data Preparation
The transcripts must be cleaned, structured, and enriched with metadata before analysis, which contributes directly to learning how to prepare and assess data quality.

Learning Outcome 4: Machine Teaching
The system may use retrieval-augmented generation or keyword models, so experimenting with training or fine-tuning models for accurate responses is part of the process.

Learning Outcome 5: Data Visualization
The dashboard will include charts, tables, and summaries that turn raw transcript data into clear insights for non-technical business users.

Learning Outcome 6: Reporting
The project will involve documenting the proposal, the process, and the final results in a structured way in GitHub and in Portflow.

Learning Outcome 7: Personal Leadership
The project requires initiative in shaping the scope, exploring new AI methods, and applying them to a practical business case, showing an entrepreneurial mindset.

Learning Outcome 8: Personal Goal
The out of scope part (AI Phone Receptionist) is a personal summer project. This NLP Data Analyzer is an addition to that project, I need more knowledge. So gaining experience with AI-powered data analytics dashboards, learning about RAG systems, or developing stronger skills in building end-to-end AI solutions is a very personal goal in this project.