

AI-Assisted Data Querying with Dynamic Data Dictionary

1. Overview of the AI System

This invention focuses on a cloud-based AI system designed to enable natural language data querying and automated report generation by leveraging a dynamic data dictionary. The AI interprets user inputs, processes them through the dynamic data dictionary, and generates structured queries (e.g., SQL or Python) to retrieve data from the company's internal databases. The system is aimed at both technical and non-technical users, allowing for seamless access to complex datasets using simple natural language queries.

The AI's key differentiator lies in its integration with a dynamic data dictionary, which continuously updates based on changes in the company's data architecture. This ensures that the AI generates accurate and context-specific queries that reflect the latest structure, relationships, and metadata of the company's data. This dictionary serves as a repository of information that the AI references to understand the structure, relationships, and specific attributes of the company's data. It includes details such as:

Database names

Table names and columns

Data types Relationships (e.g., primary and foreign keys)

Department affiliations

Custom business logic

Points of contact

Data refresh rates

This allows the system to generate highly accurate, context-specific queries that match the company's unique data structure. The dynamic nature of the dictionary ensures that as the data model evolves, the AI adapts accordingly, always generating queries based on the latest data architecture. Each AI instance is isolated to the specific company it serves, ensuring strict data privacy and secure operations.

2. Components of the AI System

2.1. Natural Language Processing (NLP) Engine

The AI system includes a Natural Language Processing (NLP) engine that interprets and extracts key elements from user queries, such as keywords and intent (e.g., "top sales" or "new customers"). This input is mapped to the relevant metadata in the dynamic data dictionary, allowing the AI to transform the query into a structured data request. The NLP ensures that users can communicate with the AI in plain language, without needing to understand complex query languages like SQL or Python.

2.2. Dynamic Data Dictionary Integration

A core feature of the AI is its dynamic interaction with a constantly evolving data dictionary. During the onboarding process, the AI is trained on the company's data architecture, including information about database structure (tables, columns, relationships), department affiliations, custom business logic, and data refresh rates. This dictionary is dynamically updated in real time as the company's data structure evolves, allowing the AI to always generate contextually relevant and accurate queries.

The AI's ability to automatically adapt to data changes is a key innovation, enabling it to handle the complexity of large, multi-database environments without manual reconfiguration.

2.3. AI-Driven Query Generation

The AI processes the natural language input, referencing the dynamic data dictionary to understand the structure of the company's data environment. It then generates structured queries (e.g., SQL, Python) specific to the user's request. The AI's unique ability to contextualize user inputs through the dictionary ensures that the queries are accurate and reflect the latest data architecture.

The AI also automates frequent tasks, such as scheduled queries or routine report generation, reducing manual input and increasing efficiency. This automation is fully driven by the AI, which adjusts its processes based on real-time data changes and user interaction patterns.

3. Cloud-Based AI with Isolated Instances

Each company is assigned a dedicated, isolated instance of the AI in a cloud-based infrastructure. This ensures that:

Data Privacy: The AI instance operates solely within the company's data environment, preventing any data sharing or learning across companies.

Independent Learning: The AI learns exclusively from the company's data and adapts based on its unique data structure and interactions. Knowledge and insights gained from one company are not transferred to or used by any other company.

Customization: The AI instance is tailored to the specific data architecture and business rules of the company, allowing it to generate precise queries that match the company's unique requirements.

4. Key Advantages of the AI

4.1. Non-Technical Querying

The AI system allows users without technical expertise to interact with complex data environments through natural language. By processing inputs through its NLP engine and dynamic data dictionary, the AI ensures that users can retrieve data and generate reports without needing to understand SQL, Python, or other technical languages.

4.2. Real-Time Adaptability

The AI's continuous connection with the dynamic data dictionary ensures real-time adaptability to any changes in the company's data architecture. As data structures evolve, the AI's queries are updated automatically to reflect these changes, offering flexibility and accuracy.

4.3. Data Privacy and Security

By providing each company with an isolated AI instance, the system ensures that data privacy is maintained. The AI operates independently within each company's cloud-based environment, with no risk of cross-company data sharing or breaches in confidentiality.

4.4. Automated Query and Report Generation

The AI automates recurring tasks, such as generating scheduled reports or performing routine data queries, without requiring additional user input. This feature saves time and enhances productivity by delivering insights at regular intervals.

4.5. Versatility Across Databases

The AI can operate across multi-database environments, referencing relationships stored in the dynamic data dictionary. This allows it to generate complex, cross-database queries in environments where data is dispersed across multiple systems, ensuring comprehensive data retrieval.

Conclusion

This invention presents a novel AI system that leverages a dynamic data dictionary to facilitate natural language data querying and automated report generation. By isolating each company's AI instance and enabling real-time adaptability through the data dictionary, the system ensures accurate, secure, and context-specific data retrieval. This innovation empowers non-technical users to interact with complex datasets effortlessly, while maintaining flexibility for advanced data manipulation and automation tasks.