Data Flow Diagram

The Level 1 DFD splits the whole "Gemini Pro Financial Decoder System" into its top-level sub-processes and shows how the internal data flows and data stores make the application work. The level shows in detail how financial data flows through each analysis stage.

The flow starts with "File Upload & Validation." In this, the "Upload Document" data flow comes from the "User" and enters this first process. This process is strictly only concerned with taking the user's uploaded XLSX or CSV file and doing any required first-level validation checks to verify the integrity and proper format of the document before it moves on.

After validation, the file goes to the "Data Loading & Structuring" process. The main function of this process is to parse the contents of the uploaded financial document and transform them into a structured data format, usually a pandas DataFrame. This "Structured Financial Data" is thus channeled in two important directions: it's routed through to the "AI Analysis & Prompting" process for analysis, and also saved in a "Structured Financial Data" data store so it can be easily retrieved for future use or during the course of analysis later on.

The "AI Analysis & Prompting" process is the key area of intelligence of the system. It takes the "Structured Financial Data" directly from the "Data Loading & Structuring" and, if required, from the "Structured Financial Data" store. In this piece, the application dynamically uses the correct pre-defined prompt templates against the financial information. The combined data and custom prompts are then sent as "API Calls (Data + Prompts)" to the "Google Generative AI" external system. The unprocessed analytical output that Google Generative AI produces, titled "AI Response (Raw Summary)," is fed back into our system for subsequent processing.

Two different output data streams for presentation to the user are produced from the analytical output produced. The "AI Response (Raw Summary)" is fed straight into the "Summary Generation" process. This operation is devoted to transforming the raw AI output into a well-organized, concise, and user-friendly textual summary, ready for presentation. Concurrently, data, or insights derived from the AI analysis, moves from "AI Analysis & Prompting" to the "Visualization Generation" operation. This module is responsible for generating appropriate charts and graphs, e.g., line charts for trends or bar charts for comparisons, from the processed financial data to make the complicated information easily readable.

Lastly, both the "Formatted Summary" (derived from the Summary Generation process) and the "Generated Visualizations" (derived from the Visualization Generation process) come together under the "User Interface." This User Interface is the final destination for all of the processed analytical output, a place where all of the insights are presented to the "User" for their perusal and comprehension.

