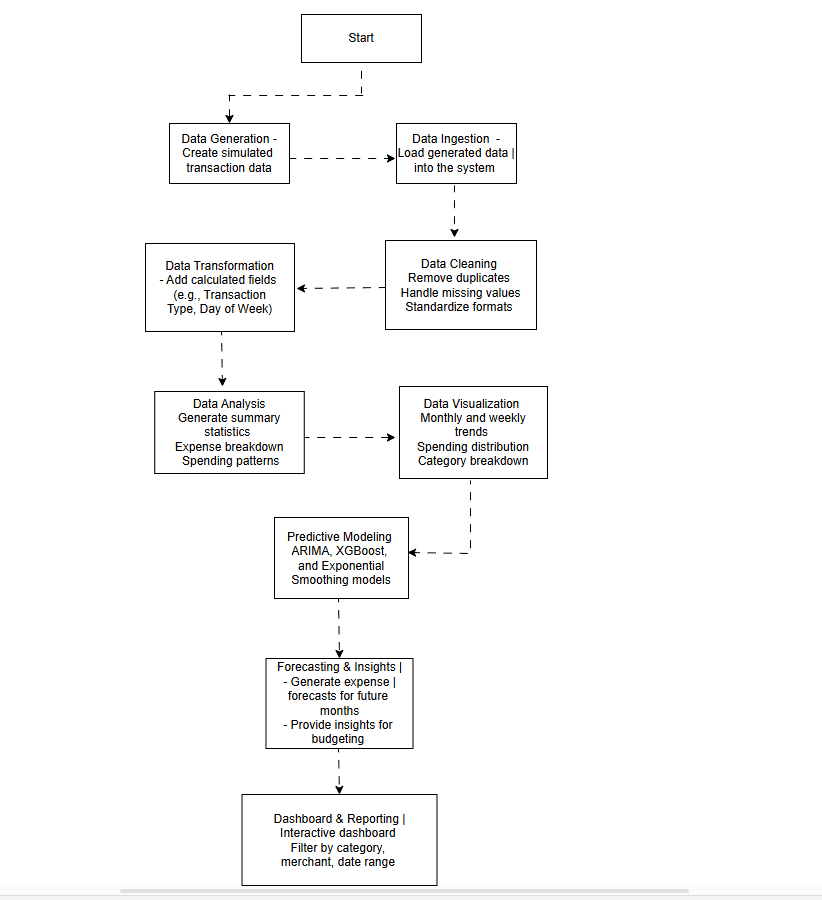
**Process Related Document**

### **Process Flow Diagrams**

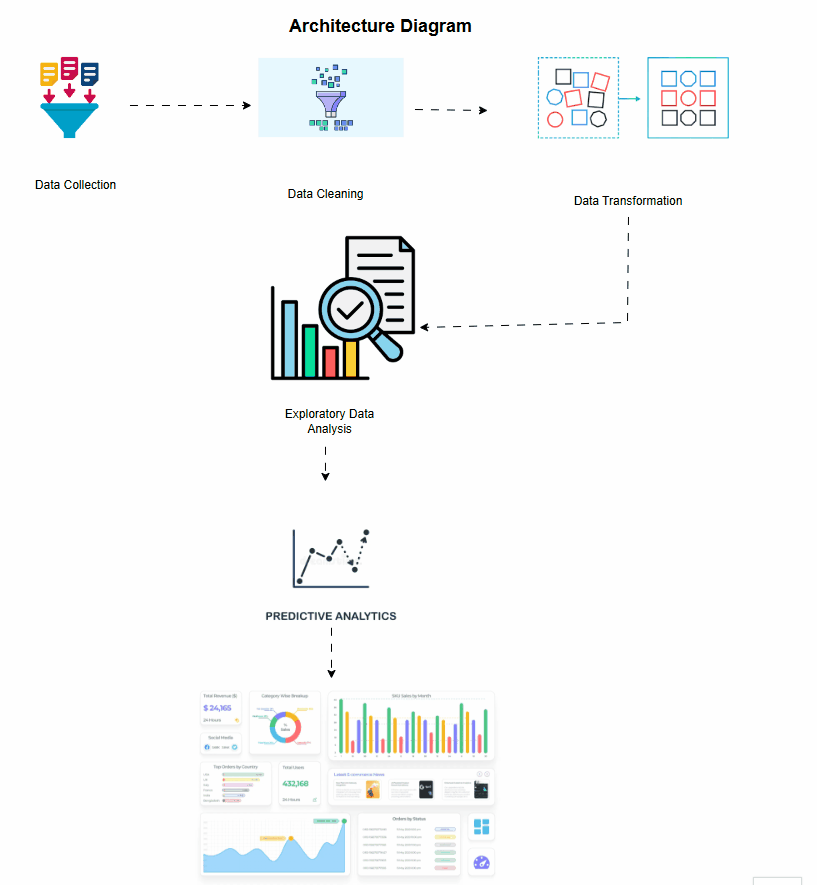
**Purpose**: Process flow diagrams outline each step of the data lifecycle, providing a clear visual representation of the processes from data ingestion through to visualization. These diagrams guide developers and stakeholders in understanding the sequence and interaction of tasks.

**Key Steps**:

1. **Load Dataset**: Ingests raw data or imported files, initializing the data pipeline.
2. **Clean Data**: Identifies and removes duplicates, handles missing values, and formats the data to ensure consistency and accuracy.
3. **Generate Statistics**: Summarizes and calculates key metrics, including monthly and daily expense totals, averages, and spending distributions.
4. **Display Visualizations**: Presents the processed data in interactive graphs and dashboards, allowing users to explore trends, view summaries, and analyze spending patterns in real time.



Architecture Diagram

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**User Stories and Use Cases**

**Purpose**: User stories and use cases capture specific scenarios in which users interact with the system, focusing on needs, actions, and expected outcomes.

* **User Story**: "As a user, I want to see my monthly spending trend to understand my spending habits over time." This story highlights the user's desire to view a timeline of expenses, which can help them identify high-spending months, track progress, and adjust budgets accordingly.
* **Use Case**: User selects a specific category (e.g., "Groceries" or "Entertainment") to filter expenses. The system then displays a filtered view of trends for that category, helping the user identify spending patterns within a single category, such as monthly or seasonal peaks.

**Functional Decomposition Documents**

**Purpose**: Functional decomposition documents break down the core functionalities of the system, detailing each task and feature to ensure thorough understanding and implementation.

**Key Functionalities**:

1. **Data Generation**: Automated creation of a mock dataset with varied categories, merchants, and transaction types.
2. **Data Cleaning**: Processes for handling missing or duplicated data, as well as standardizing formats, ensuring clean and accurate data is used for analysis.
3. **Visualizing Trends**: Implementation of graphs and charts for trend analysis, such as spending by day of the week, month-over-month comparisons, and seasonal trends.
4. **Modeling for Predictions**: Predictive analytics using ARIMA, XGBoost, and other models to generate future expense forecasts, enabling users to anticipate and plan for upcoming expenses.

**Prototypes and Wireframes**

**Purpose**: Wireframes are low-fidelity visual layouts that show the planned structure of the dashboard, offering a clear blueprint of user interaction points and data displays.

**Key Components**:

* **Monthly Expense Graphs**: Displays total spending over time, highlighting peaks and trends.
* **Category Spending Breakdown**: Visualizes expenses by category, showing where users spend the most and helping them track specific categories.
* **Forecasted Spending**: Graphs that display future expense predictions, helping users anticipate future costs based on historical trends.

**Impact Analysis Reports**

**Purpose**: Impact analysis reports evaluate the effects of new data transformations, model implementations, or feature updates on data quality, system performance, and overall insights.

**Example Analyses**:

* **Data Transformation Impact**: Assesses how data cleaning (e.g., duplicate removal) affects overall spending calculations.
* **Model Implementation Impact**: Evaluates the accuracy and performance of predictive models (e.g., ARIMA vs. XGBoost), ensuring models provide reliable forecasts without compromising processing speed.