**AUTO-DASH: Automatic Dashboard Generator**

**High-Level Design Document**

**1. Introduction**

**1.1 Purpose**

This document outlines the high-level design for AUTO-DASH, an automatic dashboard generator system that creates customized Dash applications based on user-provided CSV data.

**1.2 Scope**

AUTO-DASH aims to streamline the process of creating interactive dashboards by leveraging AI to generate code based on data insights.

**1.3 Definitions, Acronyms, and Abbreviations**

- CSV: Comma-Separated Values

- AI: Artificial Intelligence

- UI: User Interface

- API: Application Programming Interface

**2. System Overview**

AUTO-DASH is a web-based application that allows users to upload CSV files, analyzes the data, and generates a custom Dash dashboard using AI-powered code generation.

**3. System Architecture**

**3.1 Architectural Diagram**

[Insert a high-level architectural diagram here]

**3.2 Component Description**

**1. User Interface (UI)**

- Technology: Streamlit

- Purpose: Provides a web interface for users to interact with the system

**2. Data Loader**

- Input: CSV file

- Output: Preprocessed DataFrame

- Purpose: Loads and preprocesses user-uploaded data

**3. Data Analyzer**

- Input: Preprocessed DataFrame

- Output: Data insights dictionary

- Purpose: Extracts key insights and statistics from the data

**4. Prompt Builder**

- Input: Data insights

- Output: Formatted prompt string

- Purpose: Constructs a prompt for the AI model based on data insights

**5. Dashboard Generator**

- Input: Formatted prompt

- Output: Python code for Dash application

- Purpose: Interfaces with AI API to generate dashboard code

**6. Code Executor**

- Input: Generated Python code

- Output: Running Dash application

- Purpose: Saves and executes the generated Dash application code

**4. Data Flow**

1. User uploads CSV file through the Streamlit UI

2. Data Loader processes the CSV file

3. Data Analyzer extracts insights from processed data

4. Prompt Builder creates AI prompt using data insights

5. Dashboard Generator sends prompt to AI and receives Dash code

6. Code Executor saves and runs the generated Dash application

7. User interacts with the generated dashboard

**5. External Interfaces**

**5.1 User Interfaces**

- Streamlit web interface for file upload and system interaction

- Generated Dash dashboard for data visualization

**5.2 APIs**

- Google Gemini AI API for code generation

**6. Technologies and Frameworks**

- Python 3.9+

- Pandas for data processing

- Streamlit for main user interface

- Google Gemini AI for code generation

- Dash and Plotly for dashboard creation and visualization

**7. Security Considerations**

- Data privacy: Ensure user data is not stored or transmitted unnecessarily

- API security: Secure handling of AI API keys

- Input validation: Sanitize and validate all user inputs