

HIGH LEVEL DESIGN DOCUMENT FOR ANALYZE DEBT STATISTICS

DOCUMENT VERSION CONTROL

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CONTENT

- DOCUMENT VERSION
- ABSTRACT
- INTRODUCTION
- WHY THIS HIGH LEVEL DESIGN DOCUMENT
- SCOPE
- GENERAL DESCRIPTION
- PROBLEM STATEMENT
- PRODUCT PERSPECTIVE
- PROPOSED SOLUTION
- TECHNICAL REQUIREMENTS
- TOOLS USED
- POWER BI INTRODUCTION
- DESIGN DETAILS
- OPTIMIZATION
- ARCHITECTURE DESCRIPTION
- POWER BI DASHBOARD INTRODUCTION
- ANALYZE DEBT STATISTICS VISUALIZATION DASHBOARD

ABSTRACT

It's not that we humans only take debts to manage our necessities. A country may also take debt to manage its economy. For example, infrastructure spending is one costly ingredient required for a country's citizens to lead comfortable lives. The World Bank is the organization that provides debt to countries.

In this project, you are going to analyze international debt data collected by The World Bank. The data-set contains information about the amount of debt (in USD) owed by developing countries across several categories.

INTRODUCTION

WHY THIS HIGH LEVEL DESIGN DOCUMENT ?

The purpose of this High Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding, and can be used as a reference manual for how the modules interact at a high level.

THE HLD WILL -

- PRESENT ALL THE DESIGN ASPECTS AND DEFINE THEM IN DETAIL
- DESCRIBE THE USER INTERFACE BEING IMPLEMENTED
- DESCRIBE THE HARDWARE AND SOFTWARE INTERFACE
- DESCRIBE THE PERFORMANCE REQUIREMENT
- INCLUDE DEFINE FEATURE AND ARCHITECTURE OF THE PROJECT
- LIST AND DESCRIBE THE NON FUNCTIONAL ATTRIBUTES

SECURITY

RELIABILITY

MAINTAINABILITY

PORTABILITY

REUSABILITY

APPLICATION COMPATIBILITY

RESOURCE UTILIZATION

SERVICEABILITY

SCOPE

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

GENERAL DESCRIPTION

PROBLEM STATEMENT

It's not that we humans only take debts to manage our necessities. A country may also take debt to manage its economy. For example, infrastructure spending is one costly ingredient required for a country's citizens to lead comfortable lives. The World Bank is the organization that provides debt to countries.

The main objective of the project includes :

- Analyzing raw dataset.
- Perform data cleaning and preprocessing operations on the raw data.
- Building visualizations on the cleaned features using a BI tool.
- Building Dashboard using Power BI

TECHNICAL REQUIREMENTS

The solution can be a cloud-based or application hosted on an internal server or even be hosted on a local machine. For accessing this application below are the minimum requirements:

- Good internet connection.
- Web Browser.

For training model, the system requirements are as follows:

- +4 GB RAM preferred
- Operation System: windows, Linux, Mac
- Power Bi / Jupyter Notebook / Google Colab
- S3 buckets for cloud storage for the collected data.

TOOLS USED

Python Libraries such as NumPy, Pandas, Matplotlib, Seaborn, and MS-Excel and Business Intelligence tools such as Power BI, Colab / Jupyter Notebook and Python Programming Language are used to build the whole framework.



Power BI



POWER BI

Power BI is a suite of business analytics tools developed by Microsoft that allows users to analyze data and share insights. It includes a collection of software services, apps, and connectors that work together to turn data into interactive visualizations and business intelligence reports.

With Power BI, users can connect to a wide variety of data sources, including Excel spreadsheets, cloud-based and on-premises data sources, and even streaming data. Once the data is connected, users can create custom reports, dashboards, and visualizations that can be easily shared with others in their organization.

Power BI also includes features such as natural language query, which allows users to ask questions of their data using plain English, and machine learning capabilities, which can help users to identify trends and patterns in their data.

Power BI is available as a cloud-based service, as well as in desktop and mobile versions, making it accessible from a variety of devices and platforms. Additionally, Power BI integrates with other Microsoft products such as Excel, SharePoint, and Teams, as well as with third-party tools and services.

DESIGN DETAILS

Layout: A well-designed dashboard should have a clear and consistent layout that is easy to navigate. Use a grid-based layout and align elements with a consistent margin to make your dashboard look organized and professional. Use headings, text boxes, and images to group and separate different sections of your dashboard.

Color: Use color wisely to draw attention to important information and make your dashboard visually appealing. Use a limited color palette and choose colors that are easy to read and complementary. Avoid using too many bright or contrasting colors, which can be distracting or hard on the eyes.

Typography: Use typography to create hierarchy and improve readability. Choose a font that is easy to read and consistent throughout your dashboard. Use font size, weight, and color to differentiate between headings, subheadings, and body text.

Visualization: Choose visualizations that effectively communicate your data and insights. Use charts, graphs, tables, and maps to present your data in a clear and compelling way. Use appropriate chart types based on the data you are presenting and avoid using too many different types of visualizations on the same dashboard.

Interactivity: Use interactivity to make your dashboard more engaging and informative. Use filters, slicers, and drill-down capabilities to allow users to explore the data in more detail. Use tooltips and annotations to provide additional context and information.

Performance: Ensure that your dashboard is fast and responsive. Use optimized data models, avoid complex calculations or queries, and limit the amount of data you load into your dashboard. Use caching and pre-aggregation to improve performance, especially for large datasets.

Accessibility: Make your dashboard accessible to all users, including those with disabilities. Use alt text for images, provide captions for videos, and use

a high contrast mode for text and visuals. Use data tables for tabular data and ensure that your dashboard is keyboard-friendly.

OPTIMIZATION

Data Strategy and Performance.

- Removing duplicate records from the dataset.
- Handling null values.
- Performing feature encoding on the dataset.
- Building interactive filters in tableau to view data as required.
- Creating groups, hierarchy and calculated fields for easy analysis.
- Building Dashboard using Power BI.

ARCHITECTURE DESCRIPTION.

International Debt Statistics is a database and publication that presents debt statistics for countries around the world. The architecture of this database and publication can be broken down into several components:

Data Sources: The data for International Debt Statistics is sourced from a variety of international organizations, including the World Bank, the International Monetary Fund (IMF), and the Organization for Economic Cooperation and Development (OECD). These organizations collect data from national statistical agencies, central banks, and other sources.

Data Collection and Management: The data collected from various sources are processed and managed using standardized procedures to ensure consistency and comparability. The data are subjected to quality control checks and validation to ensure accuracy and reliability.

Data Aggregation and Analysis: The collected and managed data are aggregated and analyzed to produce summary statistics and indicators on various aspects of external debt, including the composition of debt, the level of debt, debt service payments, and debt sustainability.

Data Visualization and Dissemination: The statistics and indicators are presented in various formats, including tables, charts, and maps, and are disseminated through the World Bank's website and other channels. The data can also be accessed and downloaded in various formats to enable further analysis and research.

Overall, the architecture of International Debt Statistics involves a complex process of data collection, management, aggregation, analysis, visualization, and dissemination, which requires expertise in data management, economics, and international finance.

POWER BI DASHBOARD

Power BI is a business analytics service by Microsoft that provides interactive visualizations and business intelligence capabilities with an interface that is simple enough for end users to create their own reports and dashboards.

Power BI dashboards can be created using a variety of data sources, such as Excel spreadsheets, SQL databases, and cloud-based applications like Salesforce and Google Analytics. Power BI also provides connectors to many other data sources, making it easy to bring in data from multiple sources.

Once data is connected, Power BI allows users to create visually appealing and interactive dashboards. Users can drag and drop visualizations onto the canvas, customize the appearance of the dashboard, and add filters and slicers to allow for interactive exploration of the data.

Power BI dashboards also have a variety of sharing options. Users can share dashboards with others within their organization, publish dashboards to the web, or embed them into websites and other applications.

Power BI also has many advanced features, such as the ability to perform complex data modeling and calculations using DAX formulas, and the ability to create and share reports with others.

Overall, Power BI dashboards are a powerful tool for organizations to gain insights into their data, improve decision-making, and drive business success.

INTERNATIONAL DEBT STATISTICS VISUALIZATION DASHBOARD

