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SRS Requirements Document

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1. Introduction

There is a vast amount of data in society today, increasingly driven by the business world. Companies have access to this data but not all know what to do it with, this data-centered problem has created a lot of excitement within technical disciplines and academic environments within the field of “data science”. This project is centered primarily in the field of data science and data visualization. Skills in this field are what many companies are looking for and through this project, we hope to become more knowledgeable in terms of data science and visualization.

DVA will be a web application software that will aid people in creating visuals with a vast amount of data. Users will be able to upload their data on to the site, select the type of visualization template they would like to use, and based off of that, implement their visualization. The system will integrate the D3.js JavaScript library for the visualizations.

The following document is divided into ten main sections. The first two sections are the introduction and Overview. Following that is the Application Context section and the User Stories. The System Requirement Section is next with Software Qualities following right after. Other Requirements is also a section and after it is Assumptions/Risks. Lastly, a section is included regarding Priorities and Future Directions.

2. Overview/ Executive Summary

DVA is a software appliance that will be built to manipulate data into beautiful looking graphs and visualizations. This software system will provide users with an environment where they can easily input data and quickly visualize it with a chart or graph of their choice. The motivation for this software system comes from the want of users to be able to customize the data as they please in order to help them visualize and understand their data better. The system will come with its own unique set of visualizers that a user can access or the ability for a user to even add any custom visualizer of their choice.

3. Application Context/Environmental Constraints

The software system will be a web application that is used to help users visualize their data. Users will be able to login and upload data sets of their own to the system. The system in turn will then allow users to choose what visualization to apply to their data sets as well as the dimensions and colors of the visualization. The system will integrate the D3.js JavaScript library that contains a lot of predefined and pre-coded visualization methods.

4. User Stories/Scenarios

Story 1: Authentication

As a User

I want to login

Because I want to protect my content

Story 2: Upload data set

As a User

I want to upload a data set to my account

Because I want to use it for visualizations

Story 3: Load previously stored data sets

As a User

I want to load data sets I have previously uploaded on my account

Because I want to use it for visualizations

Story 4: Load previously stored data sets

As a User

I want to be able to log into a database server and import that data into my account

Because I want to use it for visualizations

Story 5: Apply a visualization style to a data set

As a User

I want to apply an existing visualization style to my data set

Because I am trying to quickly scan for the most effective style

Story 6: Customize visualization aesthetics

As a User

I want to be able to customize aesthetic parameters (colors, line widths, etc) of a visualization

Because I am trying to create the most effective aesthetic

Story 7: Customize visualization dimensionality

As a User

I want to be able to customize the dimensionality (i.e. which columns to use) of a visualization

Because I am trying to focus the visualization on the most relevant dimensions

Story 8: **Data transformation pipeline**

As a User

I want to be able to create one or more filters and data mutations via JavaScript code blocks

Because I am trying to change the data, and thus, the visualization in a particular way without altering the raw data

Scenario 1: **Administrative Assistant**

A User, that works for large company, is tasked to create a “(insert a type of visualization)”. This User is an administrative assistant with excellent knowledge of the Microsoft Suite, but that is the extent of their technical abilities. The data and a list of all of the necessary display parameters are given to the user. The User’s supervisor expects them to be able to input the data correctly, select all of the correct features to alter the visualization, and export the visualization.

Scenario 2: **Big Data Analyst**

A User is a Big Data analyst working as a consultant to a large corporation that sells products. The User is attempting to determine the environmental factors that lead to increases and decreases in sales. The User wants to find a correlation between attributes and trends and wants to see which visualization well show that the best. The User has a somewhat large dataset with various attributes.

Scenario 3: **University Researcher**

A User is a university researcher that is trying to make the newest breakthrough in their field of study. That is attempting to find correlations in data that, at face value, seems completely unrelated. The User has all of their research data stored in a public database. The user wants to be able to log into the database from the visualization appliance and retrieve all that data without having to worry about important anything. From there the User can experiment with the data and different visualization to find correlations.

5. **System Requirements Specification**

- The system shall allow users to be able to provide their own sets of data.
- The system shall allow users the ability to load a previously loaded and stored data set.
- The system shall provide a set of predetermined data visualizations for users to choose from.
- The system shall allow users to apply their choosing of visualization to their data sets.

6. **Software Qualities and Non-functional Requirements**

- The system shall provide a login system in order to provide security and protect users content.
- The system shall allow users to customize their chosen visualization such as the size or color of the visualization.
- The system shall allow users to customize the dimensionality of the visualization.

7. Other Requirements

- The application must be delivered with documentation for both users and administrators.
- The visualization extensions to be shipped with the application must be well-suited for use as examples from which to create new extensions.
- The visualization extension interface must be generic enough such that it can deal with a wide range of possible visualizations without modification to the interface itself.

8. Assumptions / Risks

We are assuming that the data sets being used in our software are not your typical big sets of data, but rather more medium sized and manageable (i.e. less than 1 million data points).

9. Priorities / Implementation Phases

Must Have:

- The DVA (the codebase of a functional server)
- The User's Guide (options available to a user of the DVA)
- The Administrative Guide (the install and configuration guide that walks from the starting point of a base-level operating system and ticks through the steps (one-by-one) of installing and configuring the DVA to operate from a specific IP address / URL)
- Generic visualization extension interface
- At least one functional visualization extension

Should Have:

- Visualization extension development documentation

Nice to Have:

- Integrated visualization extension development environment

10. Future Directions and Expected Changes

For future directions, the system should offer more built-in data visualizations.

Additionally, there is potential for different methods of data input.

