5.1 Introduction

GRNsight is a web application and service for visualizing gene regulatory networks. It consists of two parts: a web client and a server. The web client displays the web page that the user interacts with and allows the user to upload the data. Uploaded data is sent to the server, where it is formatted and processed before being returned to the web client. The web client then draws the data as a graph.

Macintosh HD:Users:Melmel:Downloads:GRNSight High Level UML Diagram.png

Section 5.2 contains the functional requirements GRNsight should be expected to have. Section 5.3 contains the performance requirements expected of GRNsight. Section 5.4 contains the environment requirements necessary for GRNsight to run.

5.2 Functional Requirements

5.2.1 Graphical User Interface

The Graphical User Interface (GUI) for the application provides the user with the ability to view and make changes to the graph, as well as upload data.

5.2.1.1 The GUI shall provide a menu system to access all functions of the application.

Application functions will include, but are not limited to:

* XLSX File Upload
* Graph Reload
* Import SIF/GraphML
* Edge Formatting

5.2.1.2 The GUI shall provide a sidebar system to access all functions involved in editing the graph.

These functions will include, but are not limited to:

* Force Graph Parameter Adjustment
* Locking/Unlocking of Force Graph Parameters
* Resetting and Undoing the Reset of the Force Graph Parameters

5.2.1.3 The GUI shall have a method of adjusting the scale and position of the graph.

5.2.1.4 The GUI shall provide demo data that can be loaded as a graph.

5.2.1.5 The GUI shall inform the user if submitted data could not be processed by the server controller.

5.2.1.6 The File Open operation shall display a file selection dialog to the user.

The file selection dialog shall not allow the user to select files that are not accepted by the server controller.

The file selection dialog shall allow the user to doubleclick a valid file and have it uploaded automatically.

The file selection dialog shall allow the user to single click a valid file, then press Open to upload the file.

5.2.1.7 The Graph Reload operation shall reload the selected graph as though it was just uploaded.

The Graph Reload operation will prompt the user that all edits will be lost on reload.

Selecting not to pursue the Graph Reload operation will cause no changes to be made to the graph.

5.2.1.8 The File Import Operation shall prompt the user to select whether to import a SIF or GraphML file.

Selecting whether to import a SIF or GraphML file will open the file selection dialog.

The file selection dialog shall not allow the user to select files that are not of the type specified in the users selection.

The file selection dialog shall allow the user to doubleclick a valid file and have it imported automatically.

The file selection dialog shall allow the user to single click a valid file, then press Open to import the file.

5.2.1.9 The Edge Formatting Operation shall prompt the user to select whether to display all graphs as though they are unweighted, or to display weighted graphs differently from unweighted graphs.

Changing the edge formatting will not reload the graph.

Changing the edge formatting will cause the changes to apply immediately after selection.

5.2.1.10 The Force Parameter Adjustment Operation shall allow the user to change the force parameters of the currently loaded graph.

Changes will take effect immediately upon change.

Changes will not require a reload to take effect.

5.2.1.11 The Lock Force Graph Parameters Operation shall allow the user to freeze the force graph parameters at the current state, preventing them from being changed.

5.2.1.12 The Reset Force Graph Parameters Operation shall change all force graph parameters back to the default value.

The reset force graph parameters operation will not cause the graph to reload.

The default values will take effect immediately.

5.2.1.15 The Undo Reset Operation shall undo a Reset Force Graph Parameters Operation, changing the force graph parameters back to whatever they were prior to reset.

The Undo Reset operation will not be selectable until a Reset has taken place.

The undo reset operation will not cause the graph to reload.

The reset values will take effect immediately.

5.2.1.16 The GUI shall allow the user to adjust the current scale of the graph.

Changing the scale will not require a reload.

Scale can be both increased and decreased.

5.2.1.17 The GUI shall allow the user to change the size of the viewable area of the graph.

The viewable area will be dynamically calculated based on the visible portion of the users browser.

The viewable area will have a fixed maximum and a fixed minimum.

The viewable area will allow the user to scroll if the graph is outside of the viewable area.

5.2.1.18 The GUI shall allow the user to change the layout type of the graph.

Changing the layout type will require a reload.

The user will be prompted to confirm layout change before a change is completed.

5.2.2 Server Controller

The server controller for the application processes and sends the data back to the web-client.

5.2.2.1 The server controller shall process inputted data.

5.2.2.2 The server controller shall return a data structure containing formatted graph data.

5.2.2.2 The server controller shall not fully process inputted data that does not follow specified requirements.

5.2.2.3 The server controller shall process data inputted in SIF, GraphML, and XLSX format.

5.2.3 Test Suite

The test suite comprehensively tests data inputted into the server controller.

5.2.3.1 The test suite shall run to completion without errors at the time of deployment.

5.2.3.2 The test suite shall be updated to include all major new functions.

5.3 Performance Requirements

5.3.1 Processing Return Time

5.3.1.1 The server controller shall take no more than 10 seconds to return processed data.

5.3.1.2 The web client shall take no more than 10 seconds to draw the processed data.

5.4 Environment Requirements

5.4.1 Development

Following are the hardware requirements for GRNsight during Development:

|  |  |
| --- | --- |
| Category | Requirement |
| Processor | Intel Pentium 4 Processor or Later |
| RAM | 1 GB |
| Hard Drive Space | 2 GB |
| Display | Any |

Following are the software requirements for GRNsight during Development:

|  |  |
| --- | --- |
| Category | Requirement |
| Browser | Chrome 56.0.2924.87 (64-bit) or later  Mozilla Firefox 51.0 (64-bit) or later |
| Operating System | Windows 7 or later  Mac OSX 10.8 or later |
| IDE | Atom  Sublime |

5.4.2 Deployment

Following are the hardware requirements for GRNsight during Deployment:

|  |  |
| --- | --- |
| Category | Requirement |
| Processor | Intel Pentium 4 Processor or Later |
| RAM | 1 GB |
| Hard Drive Space | 2 GB |
| Display | Any |

Following are the software requirements for GRNsight during Deployment:

|  |  |
| --- | --- |
| Category | Requirement |
| Operating System (Server) | Ubuntu 14.04 |
| Browser | Chrome 56.0.2924.87 (64-bit) or later  Mozilla Firefox 51.0 (64-bit) or later |
| Operating System | Windows 7 or later  Mac OSX 10.8 or later |