

More Robust Testing of Data and UI for GRNsight: a Web Application for Visualizing Models of GRNs

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GRNsight is an open source web application and service for visualizing models of gene regulatory networks (GRNs). A gene regulatory network consists of genes, transcription factors, and the regulatory connections between them which govern the level of expression of mRNA and protein from genes. GRNmap, a MATLAB program that performs parameter estimation and forward simulation of a differential equations model of a GRN, can mathematically model GRNs. GRNsight reads Microsoft Excel input and output workbooks from GRNmap and automatically displays the model data as a graph. Graph edges are color-coded based on the activation and repression relationships between the transcription factors, and nodes are color-coded with time course gene expression data. A new export-to-Excel function enables GRNsight to be used as an input workbook format validator for GRNmap, which GRNmap lacks. Toward this end, we improved the import and export functionality of GRNsight by adding 28 new tests to the testing suite, while simultaneously consolidating and debugging existing tests. This increased user awareness of specific errors and warnings in the import and export process, allowing them to fix problems with Excel workbooks before attempting to run GRNmap. Additionally, we revised the User Interface (UI) to fix graph edge display bugs, as well as viewport selection and movement issues. Along the way, we updated and streamlined the testing documentation for conducting further manual UI tests. Finally, we updated antiquated code libraries to take advantage of new features. GRNsight is freely available at <http://dondi.github.io/GRNsight/>.