New features improve GRNsight: a web application and service for visualizing models of small- to medium-scale gene regulatory networks

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GRNsight is a web application and service for visualizing models of small- to medium-scale 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, mathematically models the dynamics of GRNs, producing weight parameters that give the magnitude and direction of influence of a transcriptional regulator for its target genes. GRNsight automatically lays out either an unweighted or weighted network graph based on an GRNmap-formatted Excel workbook containing an adjacency matrix, a Simple Interaction Format (SIF) text file, or a GraphML XML file. GRNsight uses pointed and blunt arrowheads, and colors the edges and adjusts their thicknesses based on the sign (activation or repression) and magnitude of the GRNmap weight parameter. Visualizations can be modified through manual node dragging and sliders that adjust the force graph parameters. New features being developed in the beta version include the ability for users to show and hide edge weights, resize the bounding box, and zoom into the visualization. GRNsight follows open and test-driven development best practices where unit tests are written before new functionality is coded. Our exhaustive testing framework consists of over 160 automated unit tests to ensure that the program is running as expected. GRNsight is freely available at <http://dondi.github.io/GRNsight/>; code is available under the open source BSD license at <https://github.com/dondi/GRNsight>.

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