Design and Layout Improvement to GRNsight v2.0: A Web app and Service for Visualizing 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. GRNsight automatically lays out GRN data contained in either an unweighted or weighted network graph based on an 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 and magnitude of an edge weight parameter. Visualizations can be modified through manual node dragging and sliders that adjust the force graph parameters. New visual features include the ability to show and hide edge weights, resize the bounding box, zoom into the visualization, and change graph layouts. New analysis features include the ability to adjust the normalization factor of the graph so that the thicknesses of the edges will be on the same scale for two different graphs, facilitating comparison, and the computation of graph statistics, such as betweenness centrality for nodes. Users can access these new features via easily accessible menu and sidebar options. GRNsight follows open and test-driven development best practices, where a testing framework consisting of over 160 automated unit tests ensures 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.