PiperNet

Version 0.5.0
User Guide

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About Document

Intended users

This software is intended to be used by scientists who are working in data analysis. This document will be used in concert with the software to generate graphs from the research datasets, figure out some hidden information and modify the datasets when analyzing the graph.

Additional documents

For general instructions to install this software, see install instructions for PiperNet.

For sample datasets, see input data format and samples.

All documents are available at https://yuewu0526.github.io/PiperNet-Docs/.

1 Software Overview

This software is a desktop visual analytics application developed to aid the interpretation of complex datasets.

This software supports visualization from various input data formats to 2D or 3D graphs. After the graph is created, this software offers detailed information of nodes and edges. A table of statics is provided to modify data for updating the graph. Changes such as adding labels to the graph, color the nodes through attributes and merge or separate nodes groups can be done in this software assisting data research. A fixed dataset will be export in GEXF and CSV format at the end of data analysis.

2 Data Import

You can import data to the start scene. The acceptable data formats are Comma Separated Values and Graph Exchange XML Format. To bring data to this application, click **Graph** pop-up menu on the bar above and choose **Import from CSV...** or **Import from GEXF...** according to the data format. An import dialog is displayed.
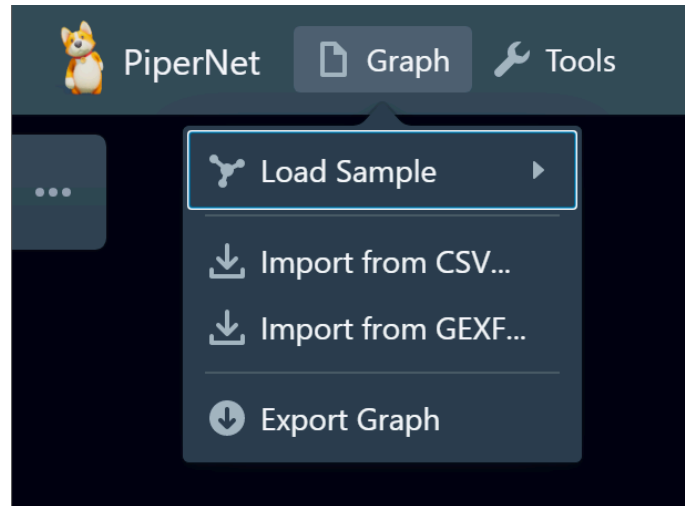

If you **import CSV files**, there are two options which are import **only edges file** or **both nodes and edge file**.

To import only edges file, choose **only edges file** and **Browse** to select the folder in which the edges file you want to import is located.
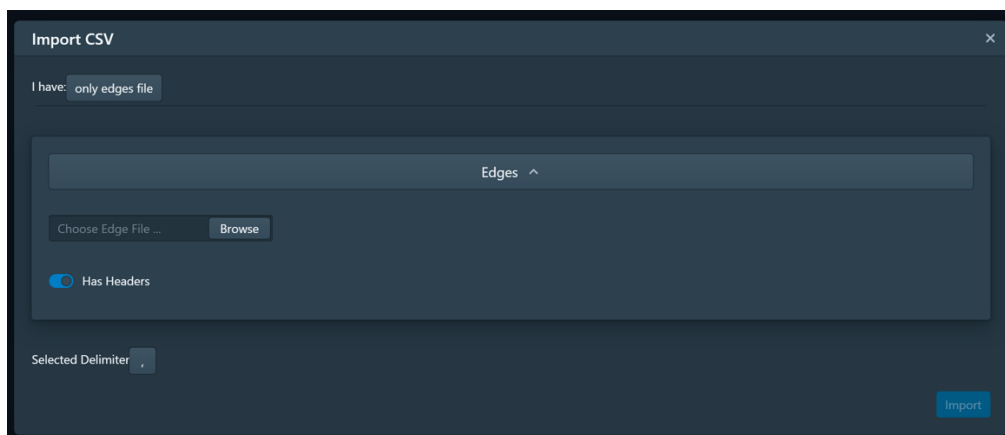

If you want to import both nodes and edges file, choose **both nodes and edges file** and click **Browse** to select the folder in which the matching nodes and edges file you want to import are located.
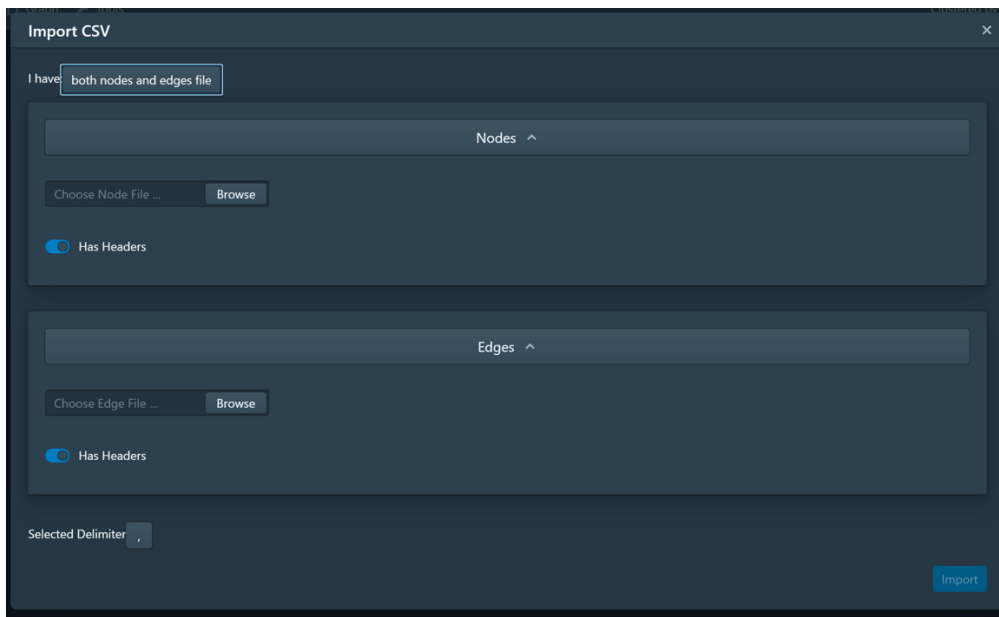
Choose the appropriate delimiter in **Selected Delimiter** then the data will be previewed in the correct format. By default, the first ten rows of data will be shown below, where you can choose whether to **hasHeaders** to include header attribute or not. Select the Source Node ID column and Target Node ID Column in edges files. Select Node ID column if the nodes file is chosen. Click **Import** when all settings are done.

If you want to **import GEXF files**, in the dialog, click **Browse** to select files on your disk and click **Import**.
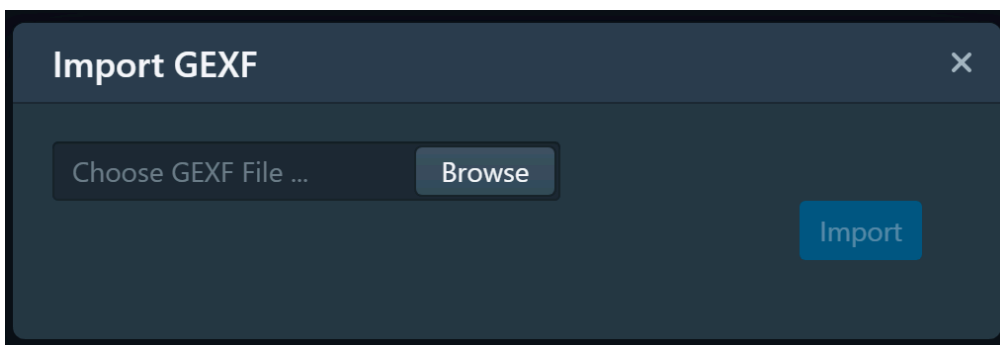
After importing data, you are able to see a 3-dimensional **non-directed** Graph base on the imported datasets.
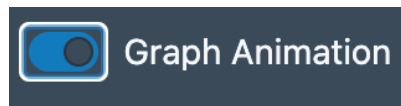
3 Data Visualization in 3D

View graph

To view the graph from different angle and size, the following operations can be applied:

■ Rotate:
  hold the left mouse
■ Pan:
  hold the right mouse
■ Zoom:
  mouse wheel

To start or resume the **graph animation**, switch on or switch off to control automatic animation.

View node details

For more details of a certain node, the mouse **hover** can show a label of the node ID. Detailed information of the node such as node ID and other attributes will be displayed in a **table** on the right-top side of the software.

Left click the node, the **table** on the right-top will display the node details.

Hold **Control** or **Shift** and **left click** the node, multi-select the nodes. When the nodes are selected, they will be painted to other colors. The corresponding information of these nodes will be displayed at bottom of the scene. All properties of the nodes are included in this table.

To deselect the nodes, hold **Control** or **Shift** and **left click** the node. When the color of nodes turns into the previous one, the nodes are unselected. When the nodes are not selected, the details of the nodes will not be shown in the table.

The node attributes are editable through the table by choose and double click the cell in the table.
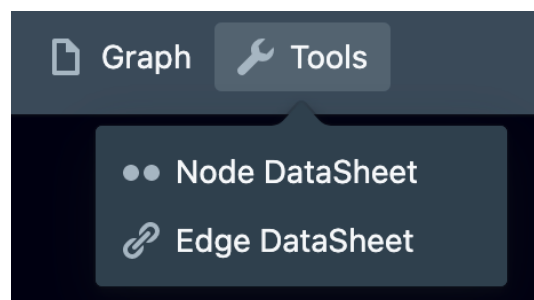
4 Data Processing

Section 1 modify statics in data sheets

Node Data Sheet

To update the scope of data to be visualized halfway, do the following:

Click **Tools** pop-up menu and choose **Node DataSheet** from this menu, a data sheet dialog is displayed.

If you want to plot the graph with certain range of data, you need to select data by turn on of turn off the switch button is "**Show**" column. If the switch button is on, this row of data will be displayed in the graph. By contrast, the data will not be displayed in the graph is the switch button is off.

If you want to delete nodes, click **Delete** at the front of the row. A dialog will be displayed with all node attributes. Click **Cancel** if you do not want to delete the node. Press **Confirm Delete** button to delete the node.

To change the attributes of the data, select and double click the cell that you intended to change and type in the modified value.

If you want to add nodes, click **Add Node** and a dialog will pop-up. Enter the new node id and other attributes. Only a new node with unique id will be added. Click **confirm** then the new node is added to the bottom of the data sheet. If you do not want to add nodes, click **Cancel**.

If the data sheet is not updated with new nodes, click **Refresh** to update the node sheet. A new graph will be generated by clicking **Refresh**.

If you find difficulty in finding nodes, **Search any Node…** can aid you. Type the value of node id, nodes whose id contain the value will be demonstrated in the table below.

Edge Data Sheet

To update the relationship between nodes, do the following:

Click **Tools** pop-up menu and choose **Edge DataSheet** from this menu, a data sheet dialog is displayed.

If you want to delete edges, click **Delete** at the front of the row. A dialog will be displayed with source node id and target node id. Click **Cancel** if you do not want to delete this edge. Press **Confirm Delete** button to delete the edge.

If you want to add edges, click **Add Edge** and a dialog will be displayed. Type the value for filtering nodes in order to find the node quicker. Click **confirm** then the new node is added to the bottom of the data sheet. Otherwise, click **Cancel** to quit.

If the data sheet is not updated with new edges, click **Refresh** to update the edge data sheet. A new graph will be generated by clicking **Refresh**.

To find certain edges, **Search any Source or Target id…** helps. Type the value of node id, edges connect to the nodes containing the value in node id will be displayed below in the table.

Section 2 Cluster

To choose the attribute for cluster, do the following:

Choose **Clustered by** at the top of the scene. All attributes of the nodes will be shown in the menu. By default, the cluster is none and no cluster is formed. When a new attribute is selected for cluster, the graph will be refreshed. Nodes in different clusters will be packed by 3D convex hulls in different colors.

Section 3 Search

To look up for a certain node, do the followings:

Type in **node id** in this search box, all nodes with id containing the value typed in will pop-up in a list. Click the node id, the camera will focus on this node and the corresponding node details will be displayed at the top-right table.

To search nodes through attributes, type in **'attr:'** with **'attribute names:'** and the **value**, for example, attr: type: person. After the search conditions are typed in, a list of nodes will be displayed above the search box. Click the node id, the camera will focus on this node and the corresponding node details will be displayed at the top-right table.


Section 4 Add and delete nodes or edges

To add nodes on the graph, first, **right-click** the background and a menu with **Add Node** will be pop-up. Then click Add Node and a dialog will be displayed. Type in Node ID and it will automatically check its validation. If the validation check of the new node ID is passed, the new node can be created with other possible attributes.
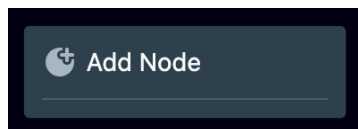
To delete nodes, first, right-click the node and a menu will be displayed. Click **Delete Node** in the menu, then the node will be deleted.
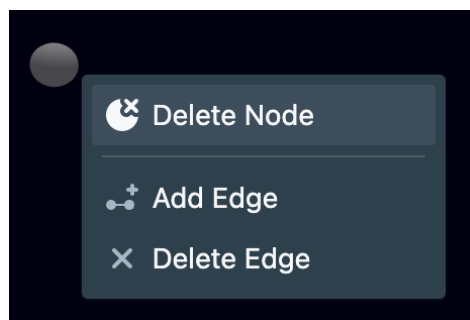
//delete edge
//delete node

5 Export Data

Use the Export command to compile the data into a **CSV** or **GEXF** file that can be used in data analysis later. The entire contents of the modified data are included in the export file. To export data, do the following:

Click **Graph** pop-up menu and choose **Export Graph**. An Export Graph dialog is displayed.
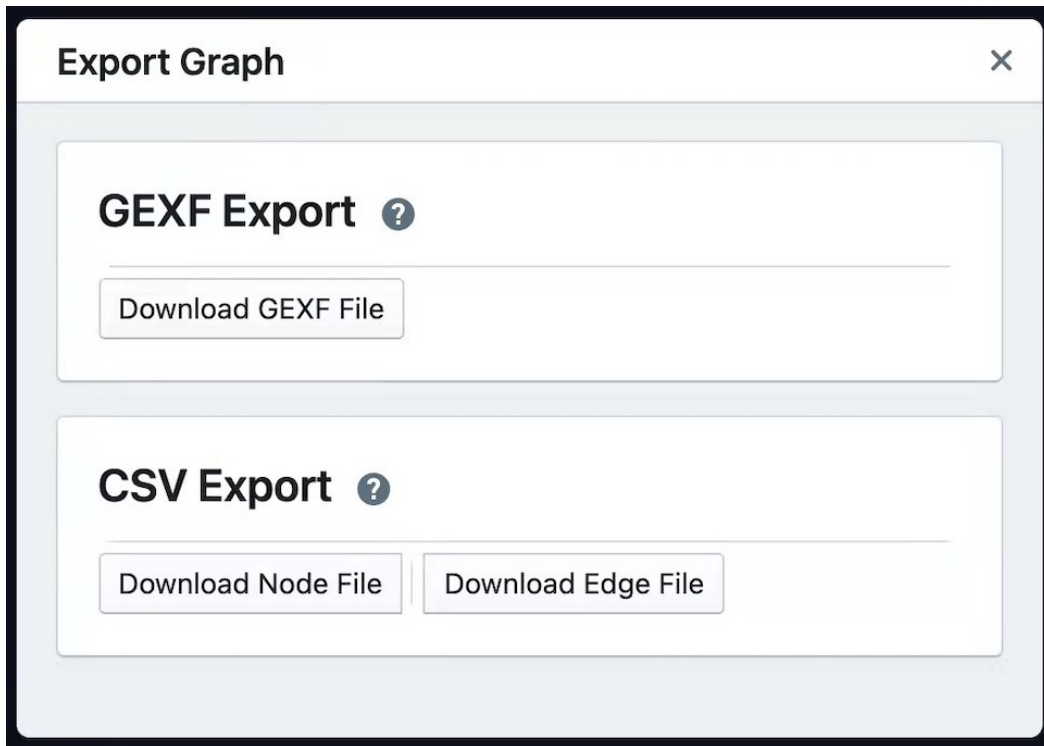
To export to a **GEXF** file, click **Download GEXF File** to download the GEXF file containing all data values to your disk.

To export in **CSV** format, click **Download Node File** to select the location to store the file of node attributes. Click **Download Node File** to download the file of edges' information to the default location.