

MITANDAO

Social network analyzer

USER GUIDE

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What is Mitandao?

Mitandao is an open source software for social network analysis which can be used as a stand alone application or as a library. Mitandao is an extensible application, where you can add your own modules for network analysis. Mitandao library provides useful framework for creating social network analysis application. You can find all important information about Mitandao, as application, library or a framework for developers in our user guides.

Mitandao was developed by group of students of Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava, Slovakia.

Who is this guide for?

This guide is for users of Mitandao stand alone application. It describes the graphical user interface of the application and its usage.

Hardware and Software requirements

Application requires computer with installed JRE 1.6 or higher and more than 256 MB of memory.

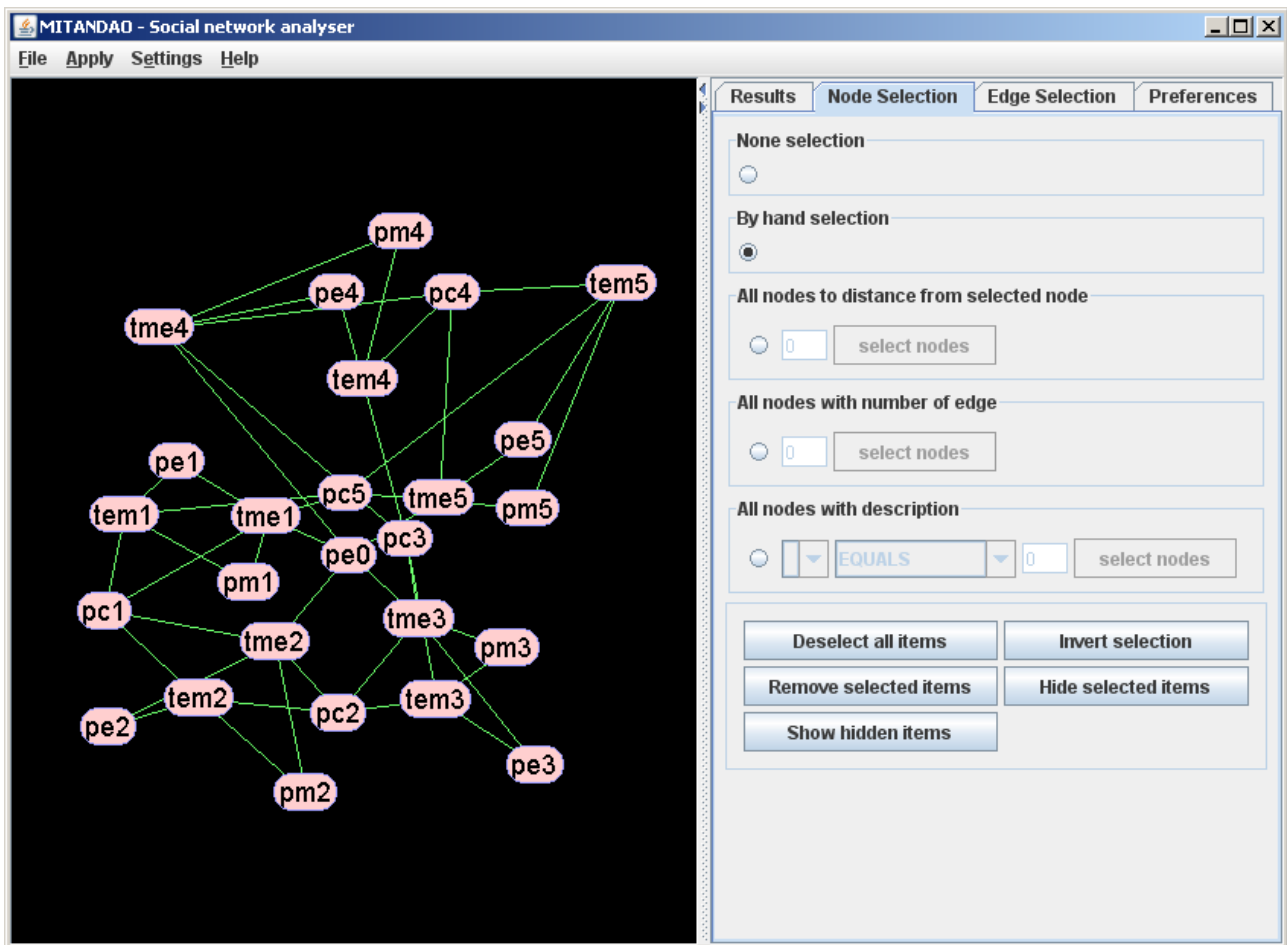
Installation and how to run Mitandao?

Download the Mitandao.zip from the application users section on our homepage. Unzip the file to the directory where you wish to have the Mitandao installation.

The Mitandao does not require any installation but it supposes that the java is on the PATH. For setting up JRE see the instructions on the www.java.sun.com webpage.

For Windows users: Launch the application by running run.bat file.

For Linux users: Make run.sh executable by `chmod +x run.sh`, then run the run.sh file. After starting application the main window is shown.



img. 1: Main window of application

How to work with Mitandao?

Main window

The main window is divided into two parts, on the left the loaded graph will be shown and on the right you can see all important information about nodes or edges of loaded graph or analysis results.

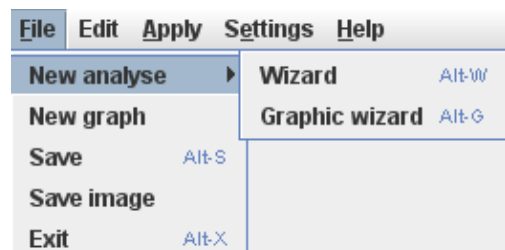
Main menu consists of 4 sections:

File

- **New analyze**
- **Wizard** – open standard wizard, recommended for new users. Wizard helps to create basic work-flow consisted of 4 steps.
- **Graphic wizard** – open graphic wizard for creating complex work-flows.
- **New graph** – activate background, so you can create new graph by adding nodes and edges
- **Save** – save current graph to specific output file
- **Save image** – save current graph to specific output as image
- **Exit** – close application

File Edit Apply Settings Help

img. 2: Menu bar

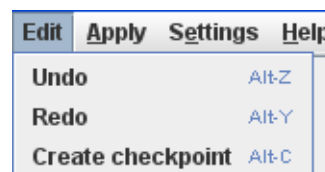


img. 3: File menu

Edit

Allows you to make checkpoints and restore graph form previous step.

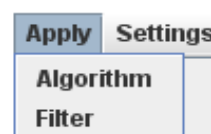
- **Undo** – restore previously checkpoint (if exists)
- **Redo** – restore next checkpoint (if exists)
- **Create checkpoint** – create checkpoint from actual loaded graph. This checkpoint exists while application is running. After exit from application all checkpoints are removed.



img. 4: Edit menu item

Apply

Allows you to apply Algorithm or Filter to the shown graph.



img. 5: Apply menu item

Settings

- **Graph...** - open window to change visual settings of nodes and edges of graph. These are global settings for all items. All changes in this section will be persistently saved automatically.



img. 6: Settings menu item

Help

- **About** – information about authors and this project



img. 7: Help menu item

Right Panel

Right panel consists of four tabs. This tabs are designed to show result of analysis, to change visual properties for graphs nodes and edges and visual work with these items.

Result tab – here you can see analysis result of selected nodes or edges

Node selection tab – in this tab you can choose method of node selection.

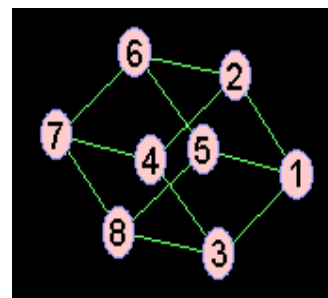
Edge selection tab – in this tab you can choose method of edge selection

Preferences tab – in this tab you can change visual properties only of selected items.

Visual surface

Visual surface is the place where graph is shown after analysis. In this place you can visually work with graph. You can change visual properties of shown graph, manually select several items and change structure of current graph.

Notice: be careful in work with large graphs. This application can show only about 1000 nodes per graph and it can take much of computer memory.

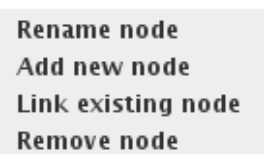


img. 8: Visual surface

Node menu

Menu is invoked by right-click on the node.

- **Rename node** – changes the label of the node
- **Add new node** – add new node with default label to graph and link with chosen node
- **Link existing node** – link chosen node with node which is left-clicked as next.
- **Remove node** – remove chosen node and edges associated with this node.



img. 9: Node menu

Edge menu

Menu is invoked by right-click on the edge.

- **Remove edge** – remove chosen edge from graph



img. 10: Edge menu

Surface menu

Menu is invoked by right-click on the background of the visual surface.

- **Add single node** – add single node with default label to graph.

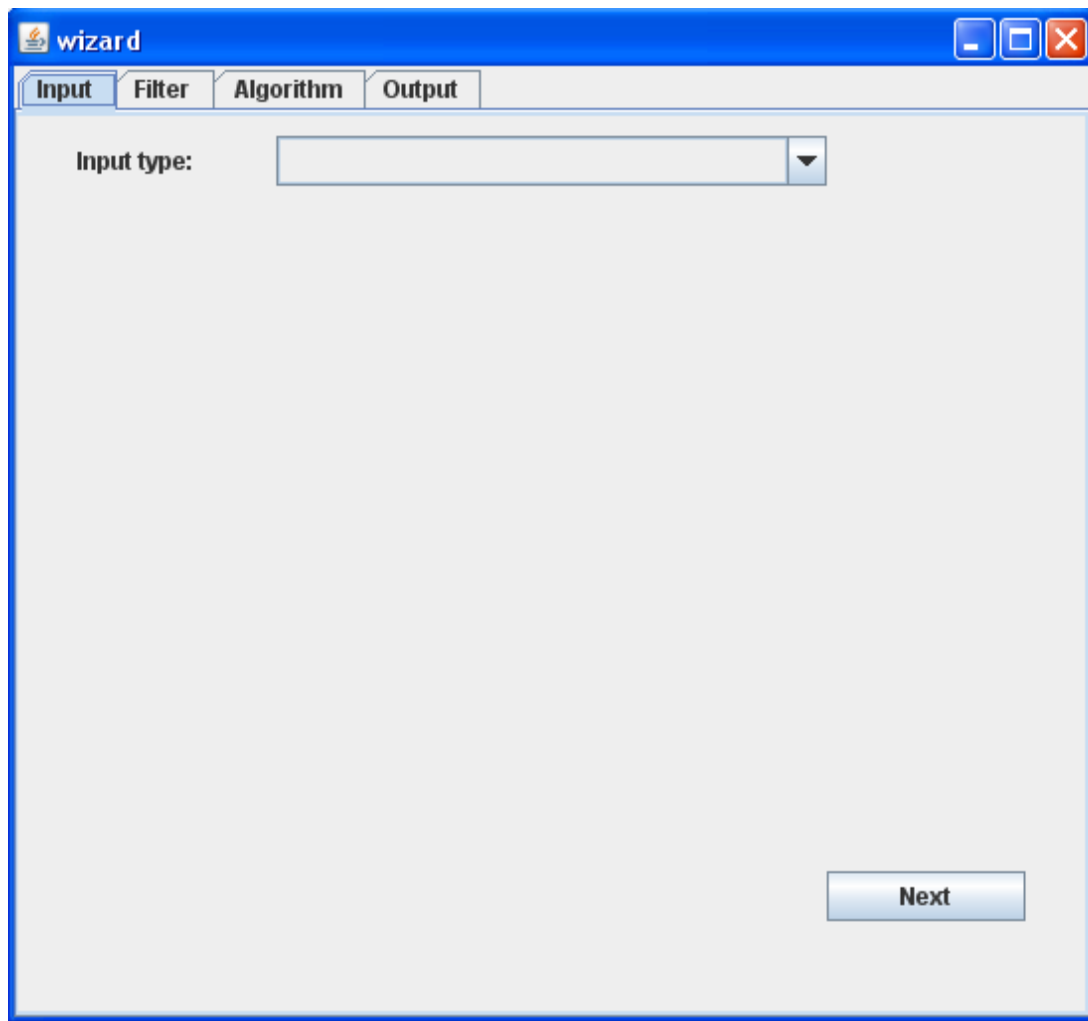


img. 11: Surface menu

Wizard

The easiest way to analyze a social network with Mitandao social network analyzer is through the Wizard, **File -> New analyze -> Wizard**. It is a guide through analysis process. Wizard consists of 4 tabs representing 4 basic steps in analysis, input, filter, algorithm and output.

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img. 12: Wizard – input tab

You can switch tabs by click on Next button and Back button or by selecting specific tab. All tabs have similar structure. All tabs except input have Next button and Back button. Input tab has next button only. In all tabs can be selected type of executable module. For example Pajek Reader in input tab. User have to select at least input file to show graph. Output type does not have to be selected and user can check show graph check box only.



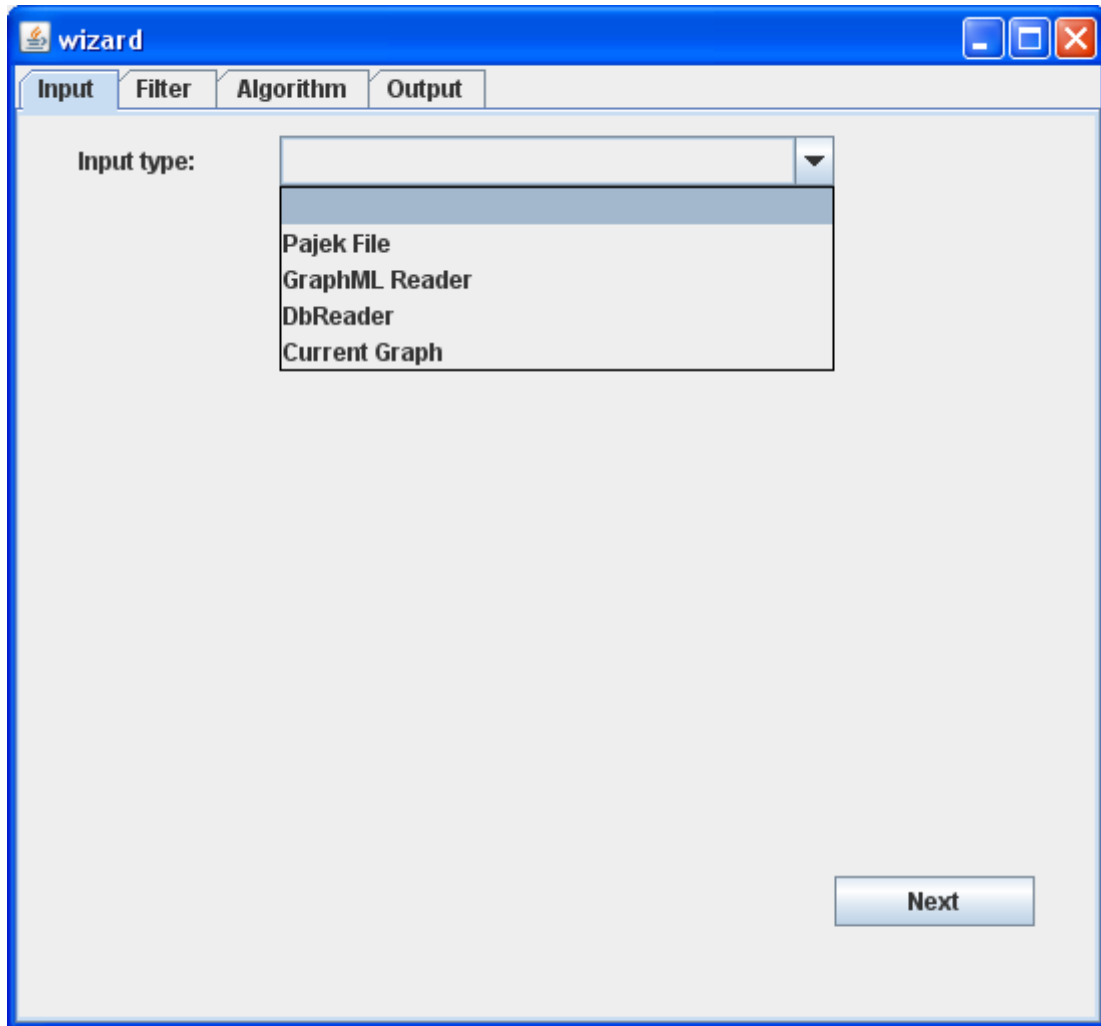
img. 13: Show graph check box

After click on the next button in output tab the analysis will be done and the result graph will be written to output file or shown in the main window.

Input tab

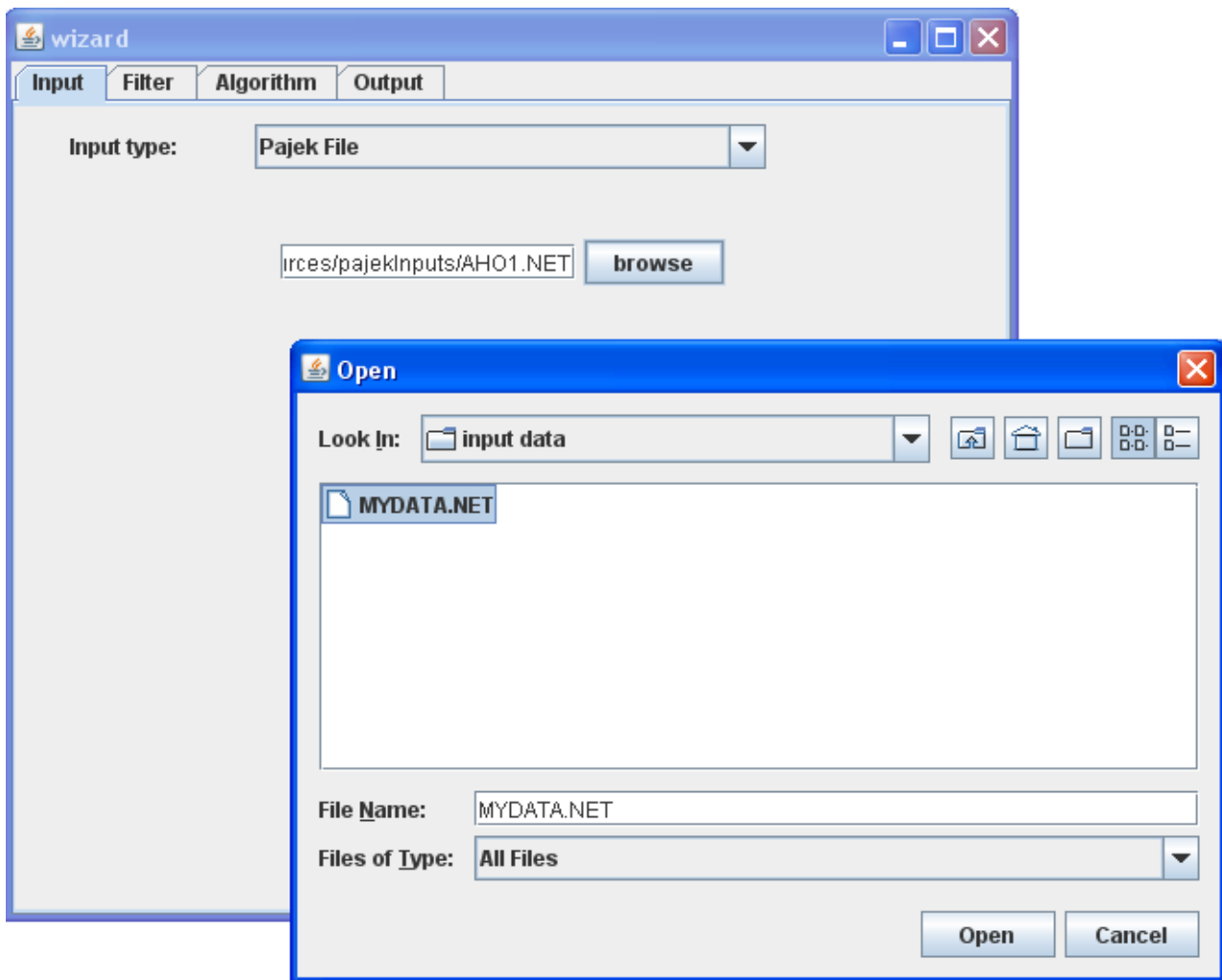
Input tab is one of the 4 tabs in wizard and represents one of the basic modules - Input Module. In this tab, can be selected type of data input and then select specific file.

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img. 14: Wizard – input tab – selecting input type

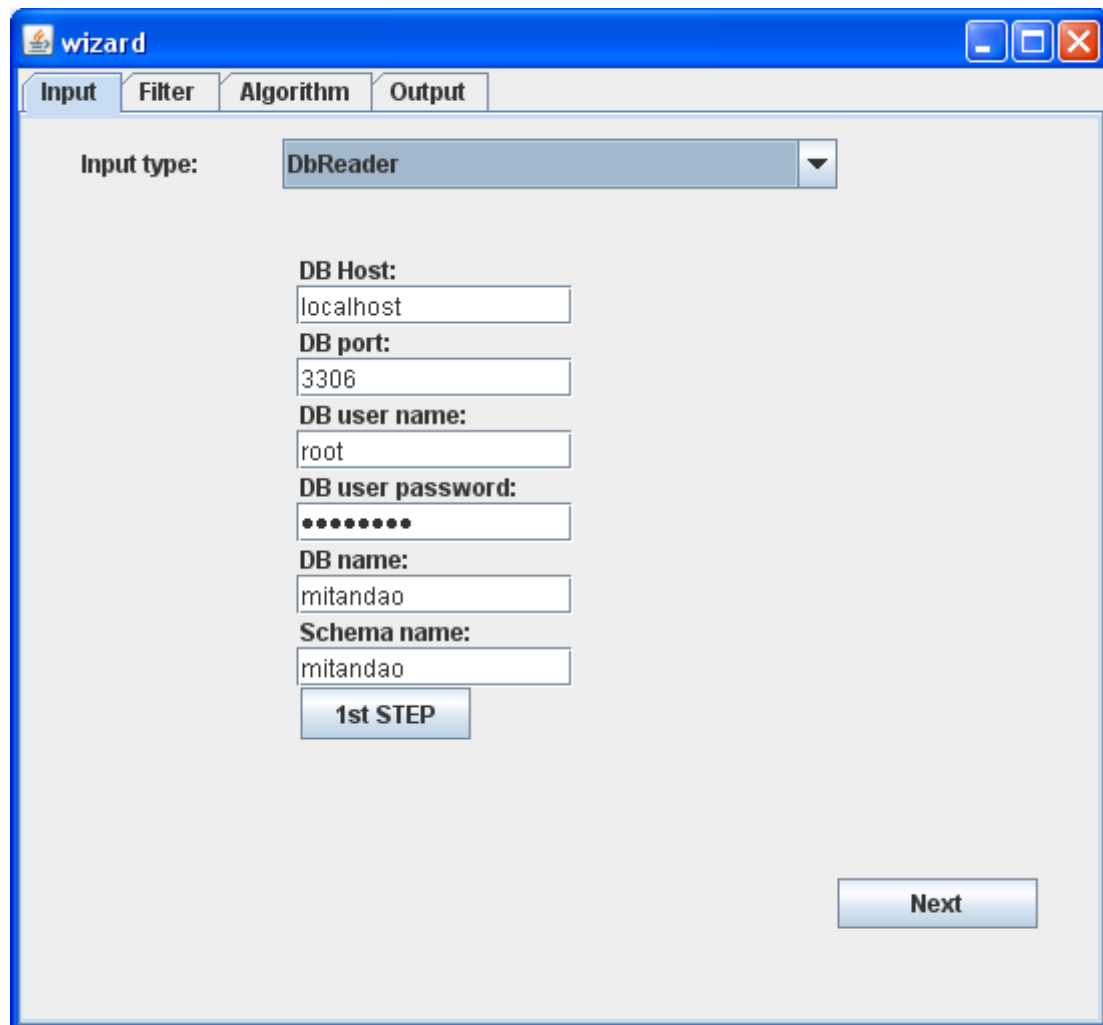
Mitandao now supports Pajek files and GraphML files. The combo box item CurrentGraph select as input graph CurrentGraph loaded and shown in previous analysis. When user choose Pajek File or GraphML Reader module the open dialog will be shown. Specific file of specified type can be selected. Select input file and click on Next button to switch the next tab or click on tab directly.



img. 15: Wizard – input tab – selecting input file

In case of db reader there are more steps necessary to get all information needed to correct data interpretation. The current implementation work with MySQL databases. The user should have an account with privileges to read database dictionaries like Information_Schema. This is required to get all the tables names to give the opportunity to the user to choose which table is holding the data, and in next step what kind of data are stored in which columns of selected table.

1.st step, img 15, consist of database identification. Information like Host, port, user, password, database name and schema name are expected.



The screenshot shows a window titled "wizard" with four tabs: "Input", "Filter", "Algorithm", and "Output". The "Input" tab is active. The "Input type" is set to "DbReader". Below this, there are several input fields:

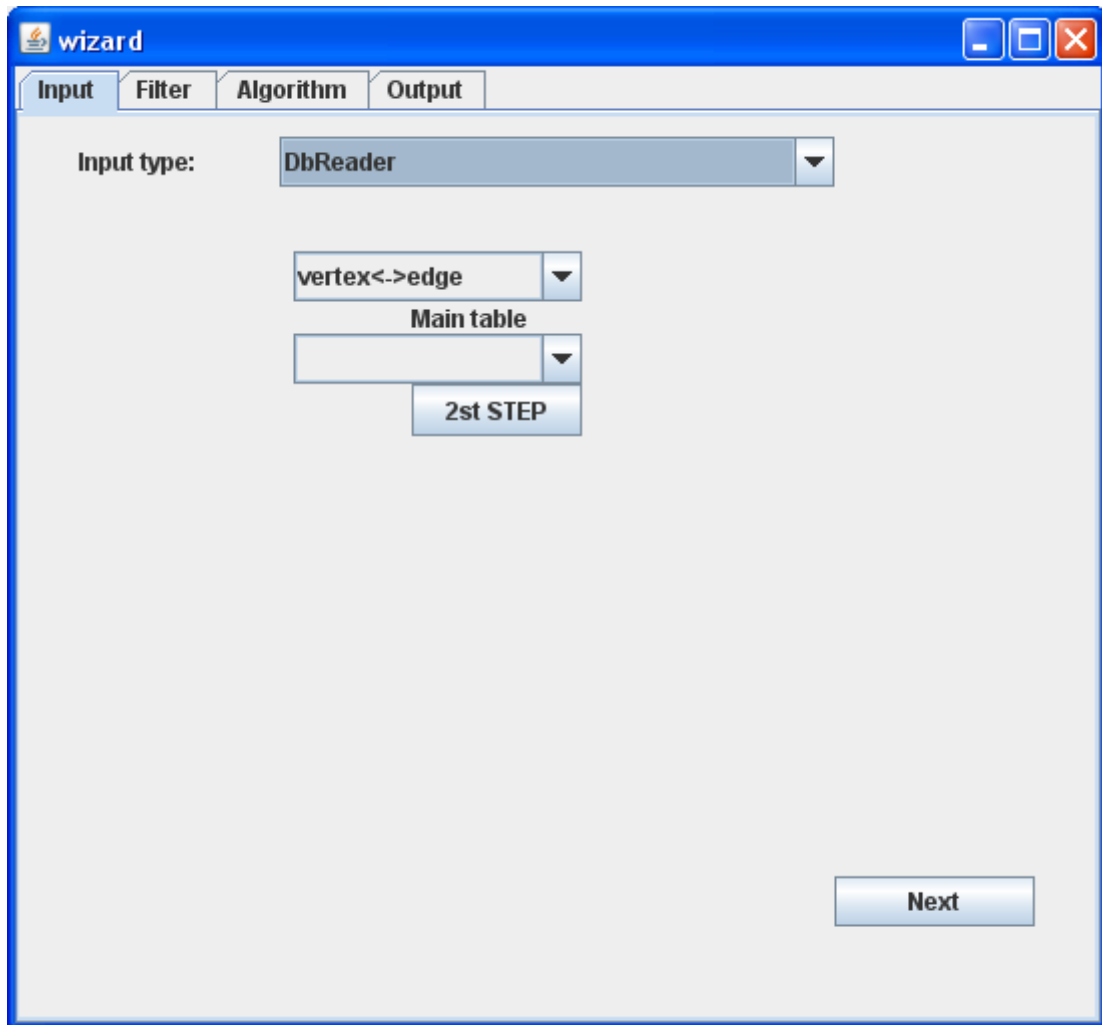
- DB Host:** localhost
- DB port:** 3306
- DB user name:** root
- DB user password:** masked with dots
- DB name:** mitandao
- Schema name:** mitandao

Below the "Schema name" field is a button labeled "1st STEP". At the bottom right of the window is a button labeled "Next".

img. 16: Wizard – input tab – DB step 1

2.nd Step/img #16/ all found tables in designate schema and their columns are listed. User should choose which table is the main table holding the graph structure and in which of two implemented formats. Tables could consist of couples vertex<->vertex or vertex<->edge

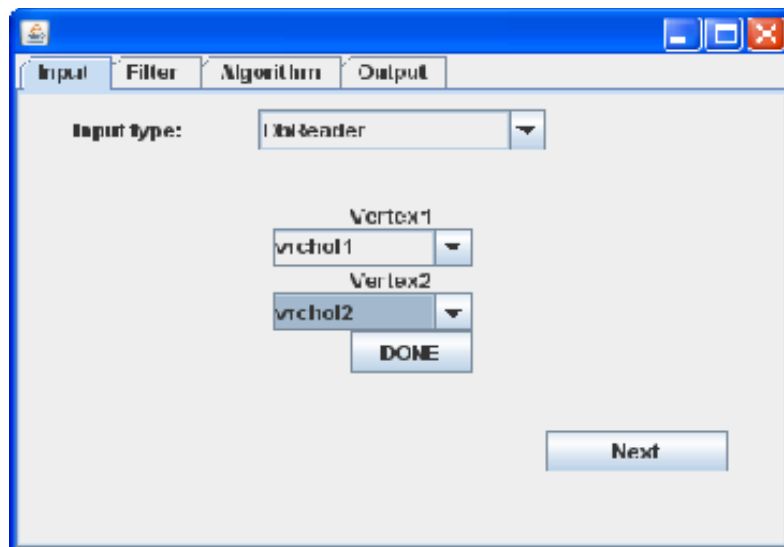
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img. 17: Wizard – input tab – DB step 2

In last step columns are mapped to vertexes or edges.

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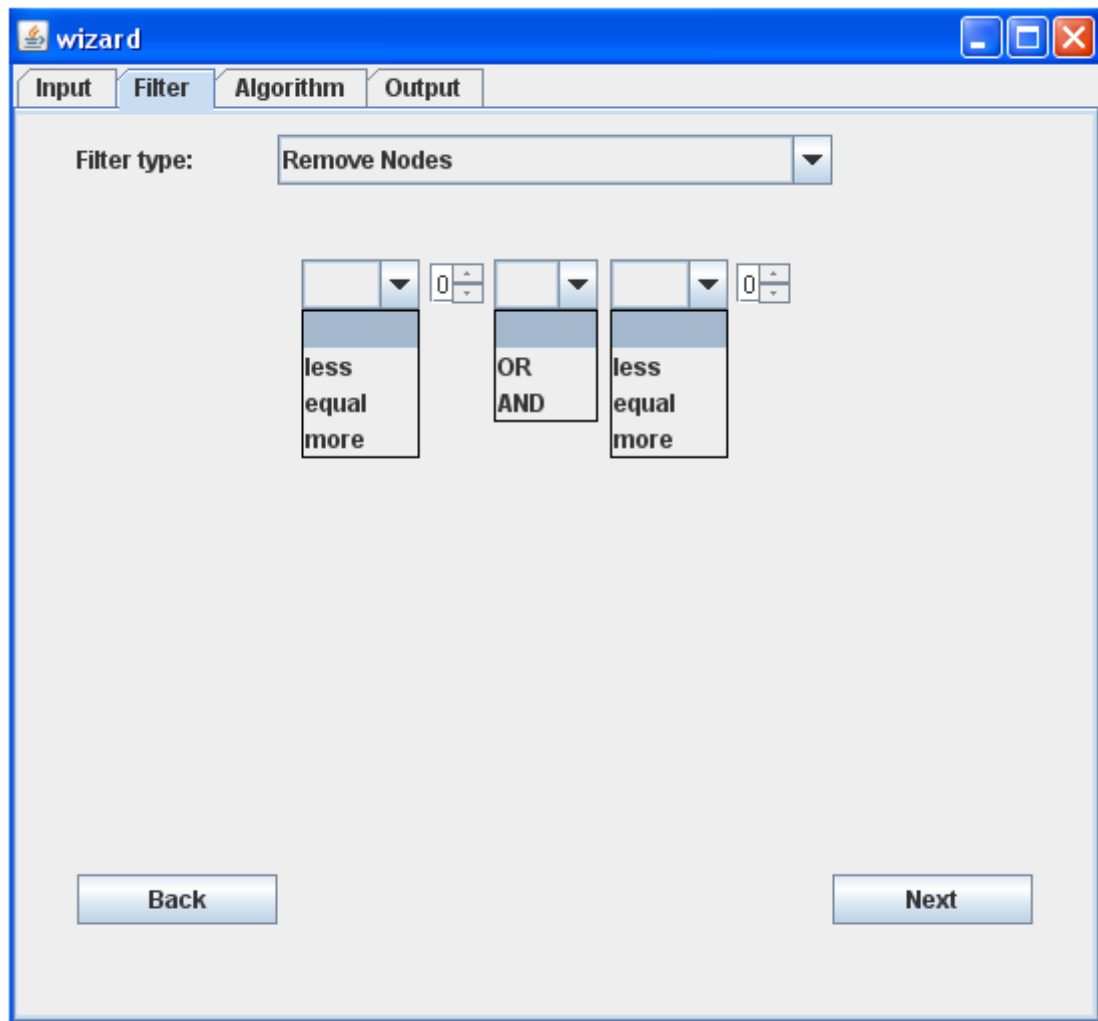
img. 18: Wizard – input tab – DB step 3

Filter tab

Second tab in wizard is Filter, this will be shown after click on Next button in input tab or Back button in algorithm tab. This tab can be picked directly by click on it.

The tab represents filter module. Filter module applied on graph can be selected. Now application supports only Remove nodes module. Module No Filter does not apply any filter.

Module Remove Nodes is complex module for removing nodes from graph. User can set the degree of nodes which should be removed from graph. Set complex condition by specifying degree less, more or equal to fix number.



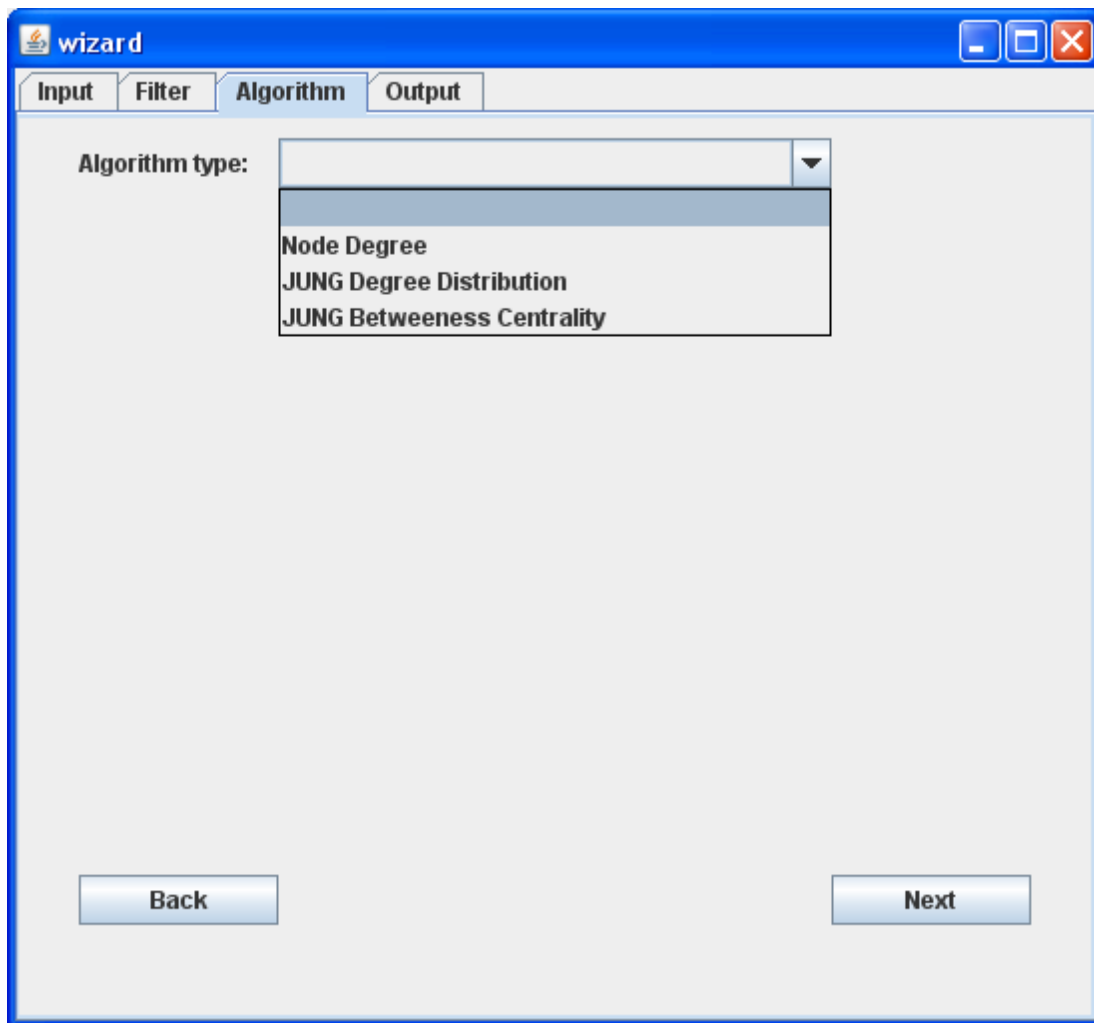
img. 19: Wizard – filter tab – setting condition for remove nodes filter

Algorithm tab

The third tab in wizard called Algorithm tab stands for algorithm module, which perform some calculations on the graph.

Mitandao has implemented three algorithm for network analysis. Two are from JUNG library and one is ours. JUNG Betweenness Centrality algorithm calculate betweenness on nodes in graph. JUNG DegreeDistribution algorithm calculate degree of each node and divide it by number of all nodes in graph. Our algorithm Node Degree calculates for each node in the graph its degree (number of edges incident with the node).

Results of algorithm are shown on the right site of the main window (Results tab).

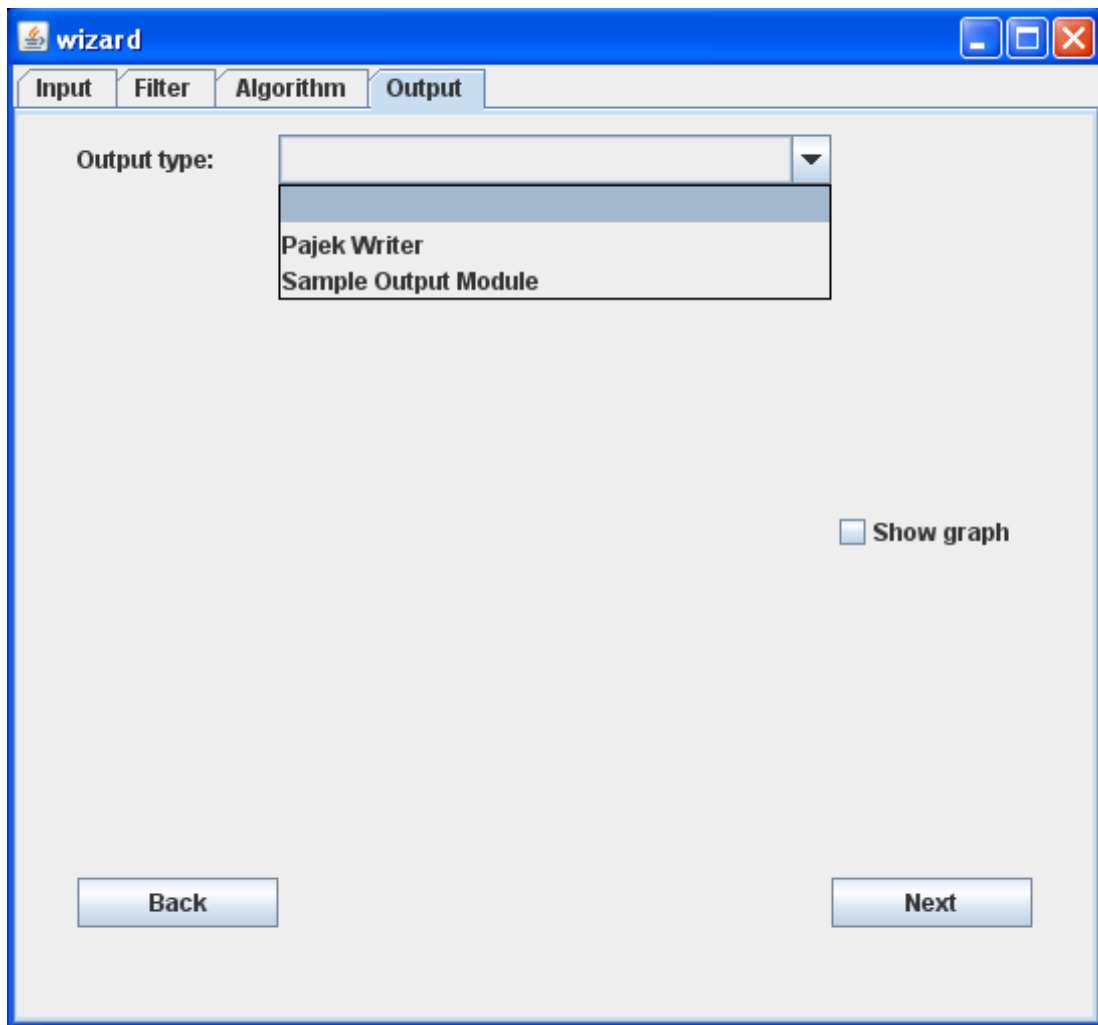


img. 20: Wizard – algorithm tab

Output tab

In the last tab, output tab, user can select one of supported output types of file and also check box “show graph” to show graph in main window. Mitandao supports Pajek file as output file. Graph does not have to be written to a file. It can be shown in main window.

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img. 21: Wizard – output tab

You can apply Filter, algorithm and output directly to a graph. There need to be some graph from previous analysis to do so. You can apply filter or algorithm by selecting **Apply ->Algorithm** or **Apply -> Filter** in main window. To save shown graph select **File -> Save** item.

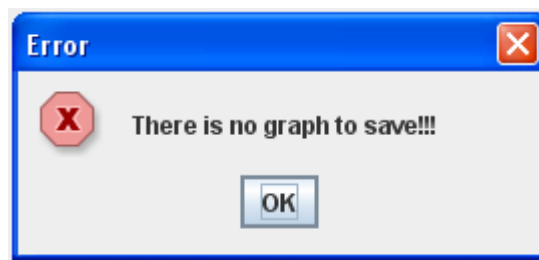
Apply algorithm or filter without current graph from previous analyze cannot be done.



img. 22: Error message1

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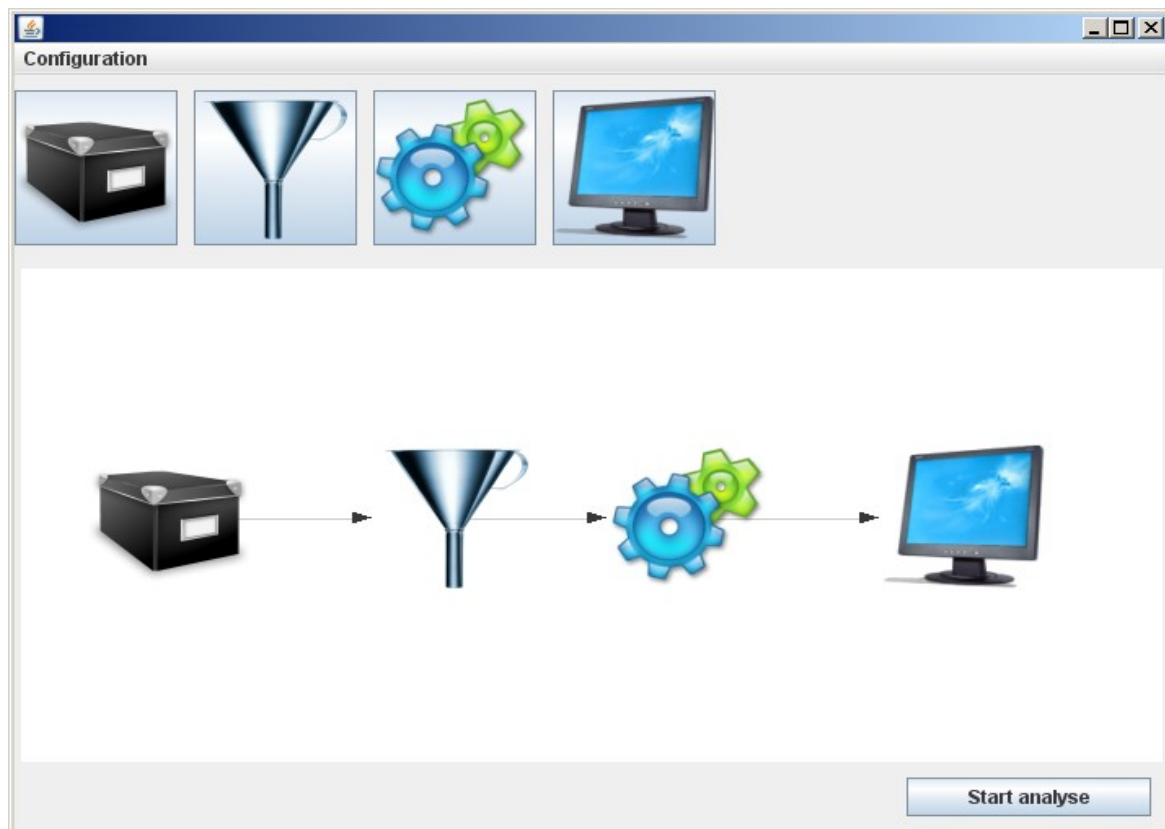
If there is no graph from previous analyze, you cannot save the graph.



img. 23: Error message 2

Graphic wizard

This wizard is designed for users with higher requirements. User can visually create sequence of user's modules and after filling all modules' settings can run analysis. It can help to change order of modules in work-flow or to extend analysis with parallel branch of modules sequences.



img. 24: Graphic wizard

Creating work-flow

There are 4 buttons on the top of the window to add new modules to work-flow. Clicking on the button brings up wizard where user should fill required settings.



img. 25: Icons of Input , Filter, Analyzator and Output module

- Each configuration must have at least one Input module module
- Each configuration should have some output module to see result of analysis.
- When you create parallel branches, graph is duplicated to all branches.
- When parallel branches is joined, it has additivity effect to the graph. That mean graphs from all branches is copied to one, and new graph is sent to next module.

Work with modules

After right-click the mouse on the module icon is shown module menu. Module menu has 6 items for manipulation and working with module.

- **Add new module** – add new module
- **Link to module** – create connection between modules.
- **Remove module** – delete module from current configuration.
- **Load module** – load module settings from XML file. Type of module must be the same as the type stored in XML file and module defined in file must be installed in application.
- **Save module** – save module settings to XML file.
- **Properties** – show dialog to fill settings for module

Add new module
Link to module
Remove module
Load module
Save module
Properties

img. 26: Modules menu



img. 27: Warning mark

If module doesn't have filled settings, it is marked with red warning icon and module's icon is shown in black&white colors. If configuration contains modules with empty or wrong settings the analysis process cannot be started.

Configuration

Whole layout of modules and wirings among modules form analysis configuration. This configuration can be saved or loaded in simple XML-based file. In the XML file, the layout of modules and the structure of analysis process are stored. In addition, in the XML file the settings for

each module in the configuration are stored.

At the very top of the window just below the title bar is the configuration menu which enables to export or import whole analysis configuration. This menu contains two items. First item allows you to save (export to file) configuration. Second item allows to load (import from file) configuration.

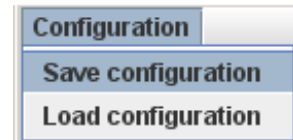
- **Save configuration**

To save configuration click on the menu item Save configuration and choose location and file from dialog window. The file will be created or re-written with actual configuration. After click on the button Save configuration will be saved.

- **Load configuration**

To load configuration click on the menu item Load configuration and choose location and file.

Notice: For successful load there must be installed all modules defined in the configuration file. If you do not have all modules, wizard shall load configuration with unknown modules.



img. 28: Configuration menu