We3Graph user's manual
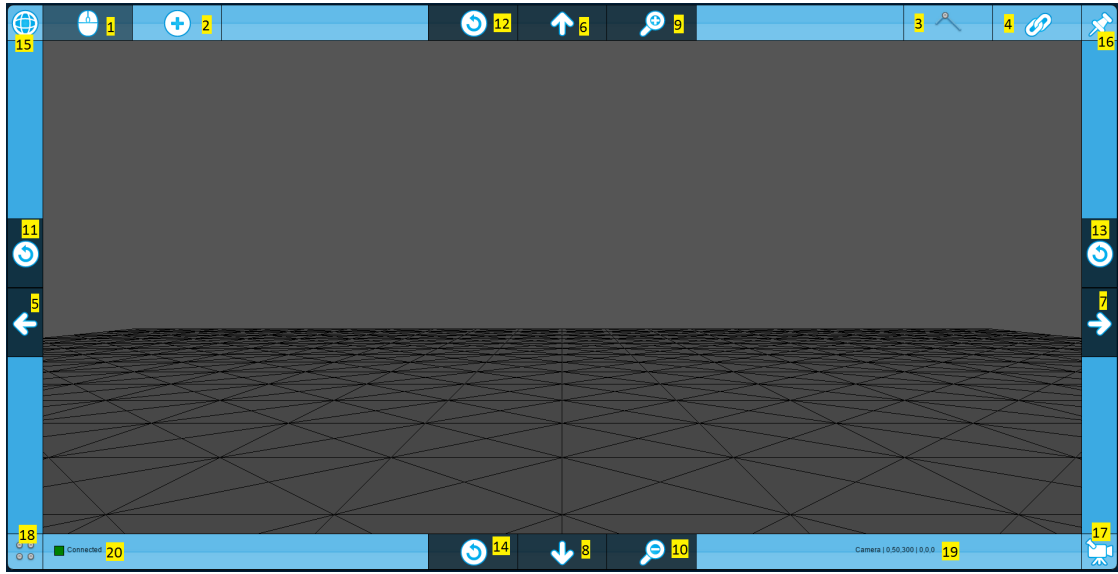
Farshad Barahimi

1 Rectangular toolbar

Figure 1: Rectangular border of We3Graph

1.1 Manipulation modes

There are four manipulation modes that result in different behaviour of the software. Four buttons on the top side of the rectangular toolbar [Figure 1, numbers 1-4] can be used to switch between these four modes. Here is an explanation of each mode:

- Normal mode: Allows the user to select and move vertices but does not allow the user to insert vertices.

- Insert mode: Allows the user to insert vertices but does not allow the user to select or move vertices.

- Bend mode: Allows the user to add bends to edges. When using mouse, right click in the normal mode can acheive the same behaviour, so this mode is more suitable for touch interaction.

- Connect mode: Allows the user to connect vertices together. When using mouse, right click in the normal mode can achive the same behaviour, so this mode is more suitable for touch interaction.

1.2 Movement buttons

Four button with an arrow icon, each on one side of the rectangular toolbar [Figure 1 numbers 5-8] allow the user to move the selection or the camera left,top,right and bottom. Also the number 9 and number 10 buttons in Figure 1 can be use to move the selection or camera forward or backward. Four button with a rotation icon, each on one side of the rectangular toolbar [Figure 1 numbers 11-14] allow the user to rotate the selection or the camera left,top,right and bottom If nothing is selected camera will be moved or rotated, otherwise the selection will be moved or rotated. If the button with a camera icon on the bottom right corner of the toolbar [Figure 1 number 17] is toggled, regardless of selection the camera will be moved or rotated.

1.3 Single and multiple selection modes

The default behaviour is single selection, that is when a new vertex or bend is selected, the previous selection is deselected. If the button with four dots in the bottom left corner of the recatnglular border [Figure 1 number 18] is toggled, multiple selection mode is activated, that is when a new vertex or bend is selected it is added to previous selection. Multiple selection is especially usefull for selecting edges as selecting the endpoint vertices of an edge is the only way of selecting an edge.

1.4 World axis or camera axis modes

Normally the selection or camera are moved based on the axis defined by orientation of the camera but if the button with a world icon on the top left corner of the rectangular toolbar [Figure 1 number 15] is toggled, the selection or camera are moved based on the world axis regardless of camera orientation.

1.5   Selection information

The text on the bottom right section of the rectangular border [Figure 1 number 19] gives some information about current seletion.

1.6   The pin button

The pin button on the top right corner of the rectangular border [Figure 1 number 16] brings the accordion menu which is described later in this manual.

2   Mouse interaction

For the mouse interaction all activities except inserting a vertex can be done in the normal mode.

2.1   Selecting

To select a vertex or bend, simply click on the vertex or bend.To select an edge go to multiple selection mode, and select the endpoint vertices of the edge.

2.2   Moving

To move a vertex or bend, press and hold left mouse button and move the mouse to the new position and release the mouse button. You can use the mouse scroll to move the selection forward or backward in the space. While dragging the vertex or bend with the mouse the coordinates of the vertex or bend will be shown. To move an edge, move the endpoint vertices of the edge. To move a line segment of an edge move the endpoint vertex(s) or bend(s) of the line segment.

2.3   Connecting

To connect two vertices, select the first vertex and right click on the second vertex.

2.4   Inserting

To add a new vertex switch to insert mode. A dummy vertex is shown. move the dummy vertex to your desired location either by moving the mouse or scrolling the mouse to move forward or backward. Once in the desired location click and you can now continue to inserting another vertex or switch back to the normal mode. To insert a bend point on a line segment of an edge, select two connected

vertices or two connected bend point or, a vertex and a connected bend point. Then right click on the desired location. A new bend wil be added at that location assuming the location you right clicked on is in a plane facing the camera with certain distance. You can adjust the location of the bend by moving it.

3 Touch interaction

Touch interaction is similar to mouse for select, move and vertex insertion operations but is different for connecting and bend insertion operations. For select, move and vertex insertion operations just use single finger touch instead of the left mouse button. Two connect two vertices, switch to connect mode, tap on the first vertex to select it and then tap on the second vertex to connect first vertex to the second vertex. To insert a bend point on a line segment of an edge, use the normal mode to normal mode, select two connected vertices or two connected bend point or, a vertex and a connected bend point. Switch to bend mode and tap on the desired location. A new bend wil be added at that location assuming the location you right clicked on is in a plane facing the camera with certain distance. You can adjust the location of the bend by moving it

4 Keyboard interaction

Here is the table of actions associated with the keyboard:

Key	Action
Left arrow	Move the selection or camera left
Right arrow	Move the selection or camera right
Up arrow	Move the selection or camera up
Down arrow	Move the selection or camera down
Shift + up arrow	Move the selection or camera forward
Shift + down arrow	Move the selection or camera backward
Ctrl + left arrow	Rotate the selection or camera left
Ctrl + right arrow	Rotate the selection or camera right
Ctrl + up arrow	Rotate the selection or camera up
Ctrl + down arrow	Rotate the selection or camera down
Delete	Delete selection
Space	Action button. Insert vertex, connect or diconnect vertices, or insert bend, depending on the selection
Tab	Select next vertex
Shift +Tab	Keeps the first selection selected, while selecting the next vertex
E	Select the next bend around the selected vertex
W	Select the previous bend along the current edge
Q	Select the next bend along the current edge
P	Select next edge for multiple edges
Ctrl + O	Exist the graph

Table 1: Keys