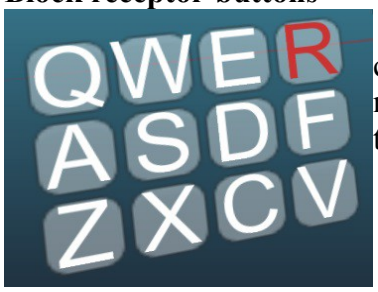
Simulation of nervous system

https://www.youtube.com/playlist?list=PLp1RVIIRg5hhPk55C8yoLpxEKPzjqZIhF
(10.2016)

Navigation

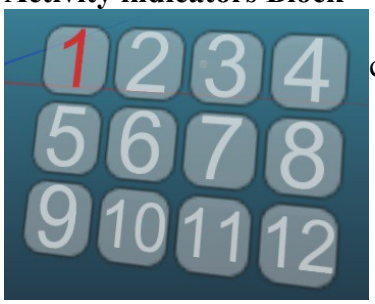
Sight camera - cube which always faces the camera. When sandwiched right mouse button, the movement of the mouse will rotate the camera around the camera sight. Average sandwiched mouse button - moving the camera sight parallel to the view plane of the camera. Scrolling the mouse wheel or removes the camera closer to the sight of the camera.

Block receptor-buttons



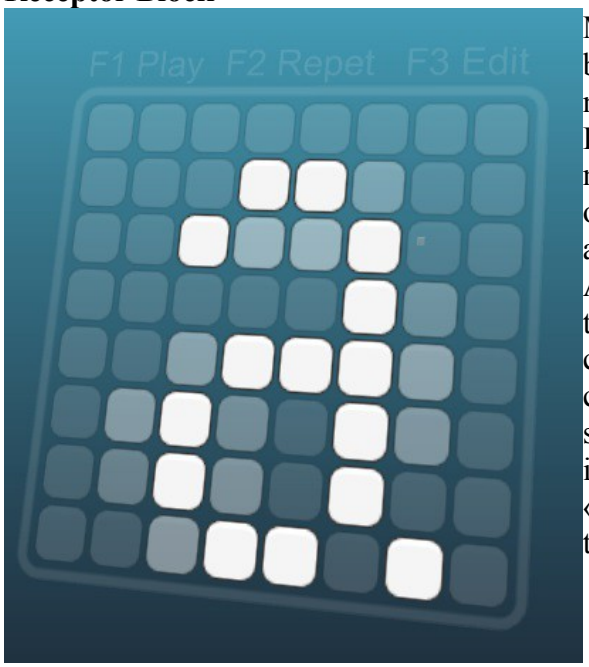
Each unit corresponds to an indicator button on your keyboard. To create a connection with the neuroelement is enough to click the left mouse button on the matching indicator. He highlighted in red. Then the intended neuroelement.

Activity indicators Block



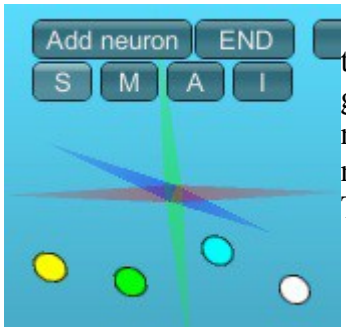
The indicator shows the status of the activity of the selected item. It configured similarly to block receptor-buttons.

Receptor Block



Mode «F3 Edit» allows you to push the connection between the elements of the block receptors and neuroelements.
Each unit is characterized by an element of the real number of 0.00 to 1.00. Clicking the left mouse button on an item if it has a value of 0.00, it becomes 1.00, and vice versa if the value was 1.00 becomes 0.00. Also, the element is released, it becomes a little larger than the other elements and appears in the lower left corner of the horizontal slider that allows you to change its value. Adjustable time delay time after a single actuation by pressing the F1 key. Or the time interval between when the receptor triggering mode «F2 Repet». By analogy with the biological receptor, the more effect the higher frequency fluctuations.

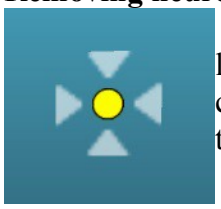
Installation Neuroelements



Press the button «Edit» to accommodate neuroelement. In the center of the camera's sight will gizmo placement neuroelement. Perhaps move the gizmo to the desired location. If you need to exit the operation neuroelement placement press the button «END». Click «Add neuron» is necessary to place neuroelement.
There is a choice neuroelement type switch due to «S M A I».

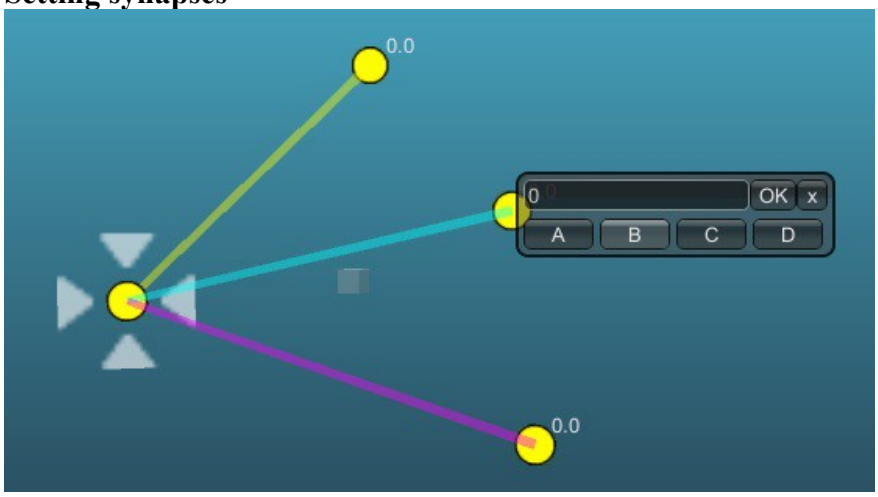
S – yellow— simple adder;
M – green — modulated neuroelement;
A — blue — associative neuralelements;
I – white — gusset element ("frozen" associative neuroelement values are not changed synapses).

Removing neuroelements



When you select a neuronelement, it is designated the appropriate marker. On the left side of the window when you select a neuron cell, there will be a number of control buttons to configure neuroelement. To delete a neuron element is necessary to press the button «Delete neuron» in the lower left corner of the program window.

Setting synapses



When you select a neuron in the left upper corner of the program window the index. The following will switch «S M A I» allows you to change the type neuroelement. Below «Add synapse» button when clicked on will be prompted to select a target neuroelement to create a synapse.
Next time you select neuroelement all synapses are highlighted, and next to the target values will be shown neuroelement synapse strength. Clicking the left mouse button on the target neuroelement synapse opens the editing window.
The synapse edit window, you can specify the value of the synapse strength and choose the type of synapse. The value of the synapse strength can be any real number of both positive and negative.

The types of synapses:
A – synapse direct action, acts on nero adder element with a predetermined force;
B – synapse modulating action, has a modulating factor in the target threshold adder neuroelemnt with this force, this type is ignored by a simple adder;
C – synapse contact activates neuroelement if it is possible at the moment, otherwise ignored force value is ignored;
D – frozen synapse direct action, which forces the value is not translated in an associative neuroelement.

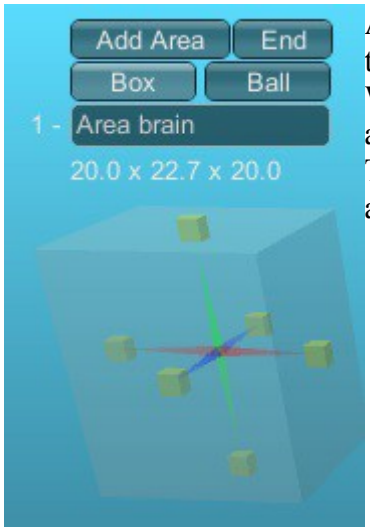
Settings neuroelements

Adder – the value of the total impact of the synapses of direct action;
Max adder — the maximum capacity of the adder, everything above is ignored. Also, the minimum value, a minus sign is inserted.
Damper — value at which the adder will count down every 0.01s.
Upper threshold — value to adder above which will lead to activation.
Response time — time from the beginning of the activation after which the response occurs.
Time relax — response time after which the neuroelement does not respond to external signals and continues to be activated.

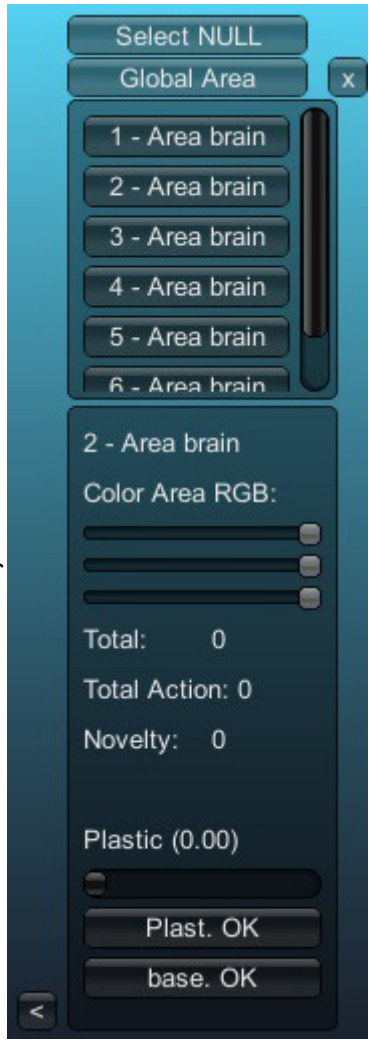
Lower threshold — appointment the adder below below which activates neuroelement in the negative mode.
Negative time — after activation element neuro negative mode in which it does not react to external stimuli (for modulating neuroelement).
Damper threshold — the value to which the reduced threshold of the additional the adder every 0.01s.
Valuation time — time counting repetitions that occur after activation.
Limit repeats — the number of repetitions in which there is no change.
Increasing threshold — the value to be increased when the threshold is exceeded, the limit of repetitions.
Adaptation time — idle time after which it will be lowering the threshold by one if the threshold value does not match the baseline.
Basic threshold — base value of the threshold. (Baseline)

Max force synapse — the maximum value of the synapse.
Speed — the time between the change of the charge values.
Focus Dynamics — dynamically change the focus.
Focus — the apex angle of the cone of focus region in which an increase in strength will occur synapse.
Max focus — the maximum value of the focus.
Focus step — value at which the focus will decrease under similar conditions to the previous actuation.
Plastic Dynamics - dynamically modify plasticity.
Plastic — Plasticity value ≥ 0 and ≤ 1.
Basic Plastic — plasticity of the newly created neurons in dynamic network mode.
Plastic step — rate of change of plasticity.

Installation areas



Area - element of the system allows to group elements. By default, there is one area of the system — Global Area.
When you press the «Edit Area» appears gizmo placement area, which allows to determine the position and size of the area placed.
There is a possibility to choose the form area using «Box / Ball» switch and also indicate the name of the field.



In the right part of the window is located on the control panel.
The button «Select NULL» - cleans the selector area, no area is selected.
«Global Area» button - selects the the global area.
Below is a list of all the areas in the scene. By clicking on the button of one of the areas will be made its choice and aim the camera will be moved to the center of the selected area.
By pressing the "X" button will produce the removal of the selected area.
The panel below the list will indicate the name of the selected area.
There is also the ability to customize the color of the area using three sliders.
The line «Total:» indicates the total number of items in the area.
In the line «Total Action:» the total number of active elements.
Line «Novelty:» Set the level of innovation for the area (0..100). In rectangular areas this indicator is duplicated in the upper right corner of the area.
Use the slider to «Plastic» and buttons «Plast. OK» and «base. OK» might be set for all the elements of area plasticity and ductility of the base.
Button "<" opens the panel to adjust the charge changes the law. Hide this area may click ">".
There are two tabs, switch between them «Positive / Negative» In the switch.
In each tab, there are sixteen vertical sliders.

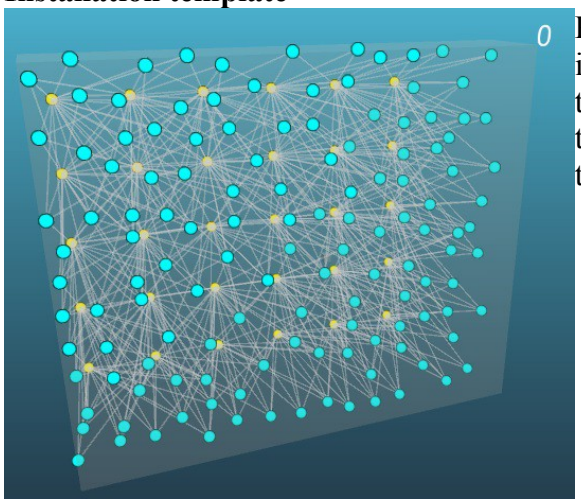
Setting scripts

«Script: on / off» button stops or include scripts execution.
«Edit Script» button opens the Script Setup panel.
Adding the script scene by pressing «Add Script» button. Next to each block of the script is the button "X", which removes the script from the scene.
Each scenario is divided into two parts: 1 - run the script; 2 - Perform the action on the script.

1 - Run the script: N – neuroelement activity. % - activity of the specific number of elements in the area; ! - a certain level of of novelty in the area.
2 - Run the action: N – activate the neuroelement; M – modulate all the neuroelements of the area P – change the plasticity of all elements in the area a fixed time.

1 / N – In the box, type in index of the neuroelement and then press the «Find» button.
1 / % – To specify the area press «selected Area», the currently selected region is established in the script settings. Push-button "> / <" you can select the condition run the script more or less than the set value of active elements. In the next line, specify the number of items and click «OK».
1 / ! – Selecting the area in a similar way. It is possible to select two modes. «Hunger» mode - if during the set time of novelty level will not rise above a certain time will run the script. «New» mode - if the level of of novelty in the selected area will be higher than the set value will run the script.
2 / N – Activate selected neuroelement.
2 / M — Exert modulatory effects on all the elements of of the selected area to the set value.
2 / P – Change the plasticity of all elements of of the selected area on the set value and time, and also to remove the factor of habituation.

Installation template



Press F9 cameras sight will show the size of the inserted pattern. Use ←, ↑, →, ↓ is possible to adjust the pattern size. By pressing the F10 key will be placed template. Pressing the F9 key will hide the inserted template marker.