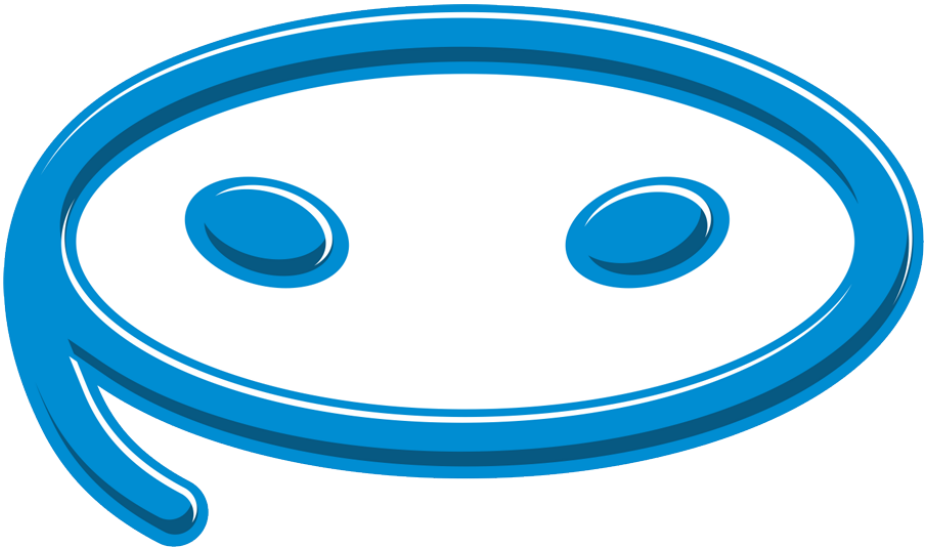
Promobot



Motion Studio Service
User guide

2019

1. General information

This guide describes the basic instructions and recommendations for using the **Promobot Motion Studio service.**

Motion Studio Service is a web-service designed to create robot scripts responsible for controlling its movements, facial expressions, gestures and illumination. **Motion Studio** has an easy-to-learn interface and does not require programming skills.

After getting access to the service, the owner of the robot receives a login and password for authorization.

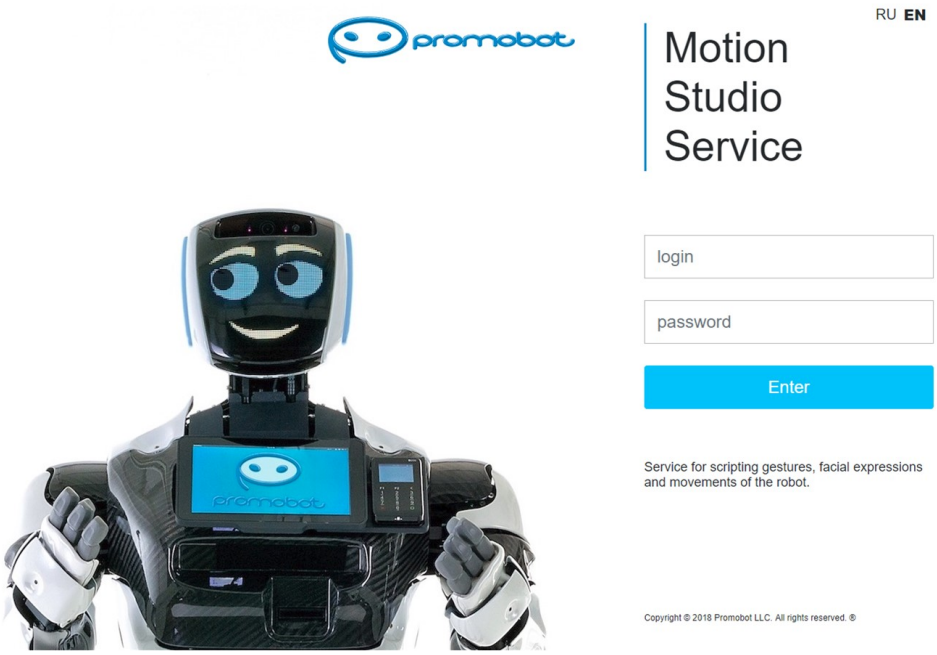
2. Terms and definitions

Script – a prepared script of robot actions intended for further periodic use. As an example, we can mention a dance script that comes with robots by default. The script of the dance will be run by voice command.

3. Getting started

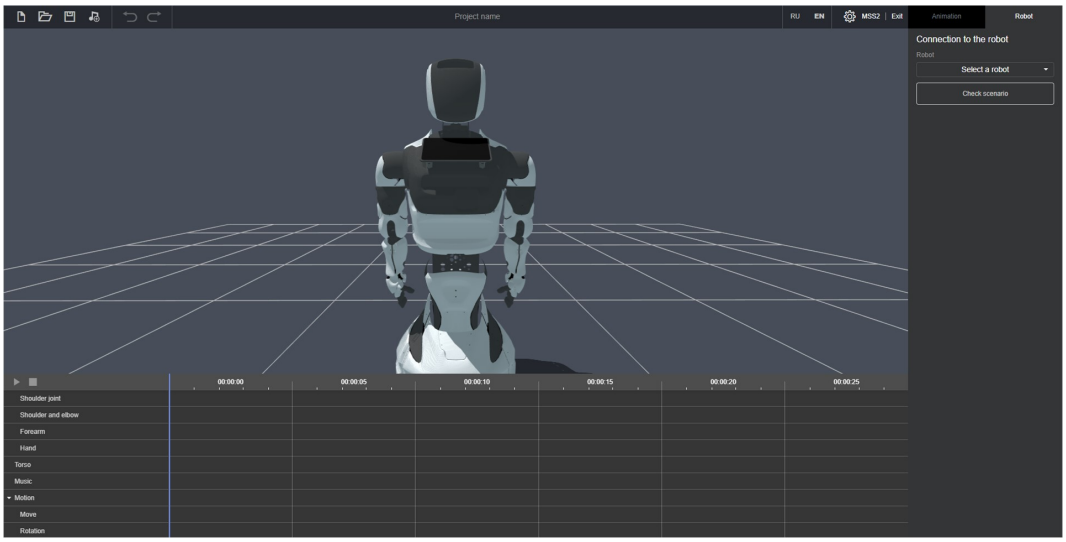
To get started with **Motion Studio**, follow these steps:

- Open the main page of the Motion Studio Service: https://motionstudio.promo-bot.ru.



The main page of MSS

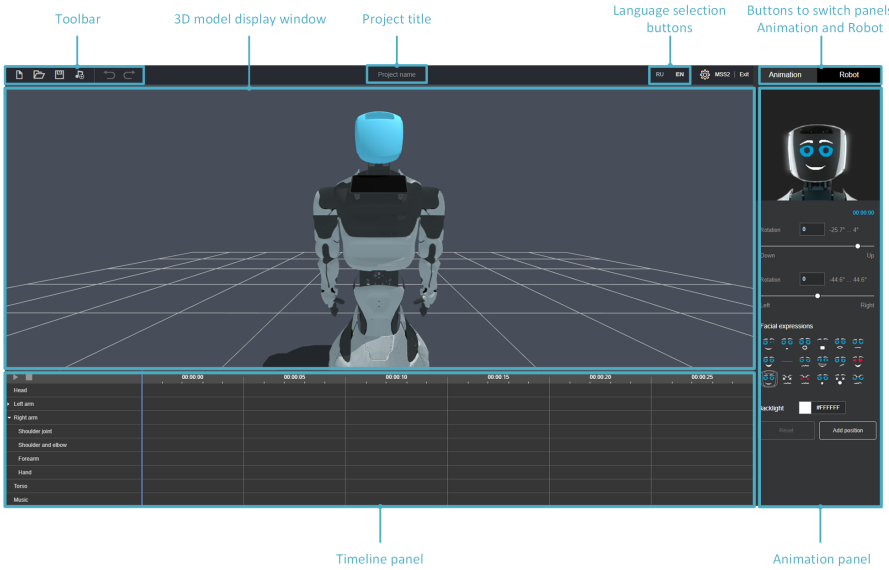
- Pass the authentication, enter the login and password provided by Promobot, and then click "**`Enter`**".



Motion Studio Service interface

4. Interface description

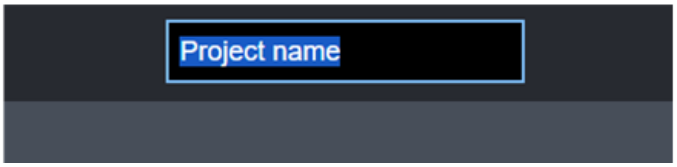
The service interface includes several main elements:



Elements of Motion Studio interface

Project title

Contains a line that displays the name given to the current script being created. By left - clicking on a row, you can switch to edit mode to change the name.



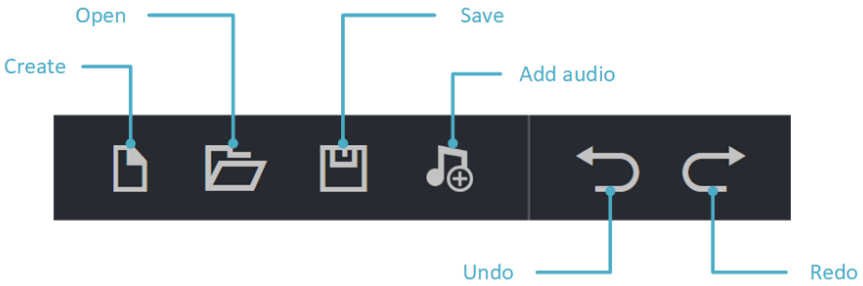
Title editing

Language selection buttons

Contains buttons that allow you to select the language of the interface. To the right is the "**Exit**" button, clicking on which closes the session with Motion Studio.

Toolbar

Contains buttons to control the script project.



Toolbar buttons

The "**Create**" button allows you to create a new script project.

The "**Open**" button allows you to open a previously saved project. Projects are stored in a format **.promobot**.

The "**Save**" button allows you to save the current project. The project will be downloaded to your local drive.

The "**Add audio**" button allows you to add an audio file to the project. The added audio file will appear in the music module, **Timeline panel**. Required files in a format **.mp3**.

The "**Undo**" button allows you to undo the last action.

The "**Redo**" button allows you to repeat the canceled action.

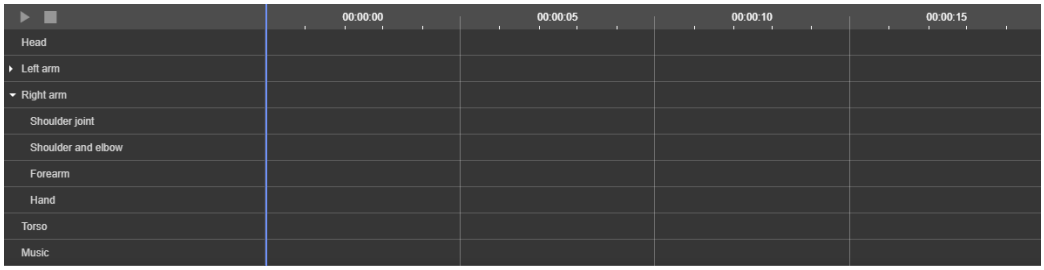
3D model display window

It is a window that displays a 3D model of the robot in an interactive form, where you can visually evaluate the work of the script before running on the robot. When you point the mouse over the window, you can control the position of the virtual camera:

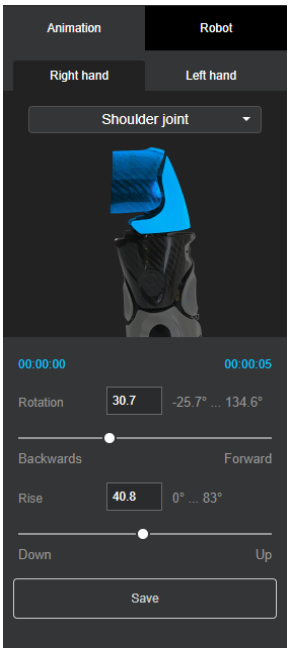
- Holding down the left mouse button allows you to rotate the camera relative to the center.
- Holding down the right mouse button allows you to change the position of the center of the scene (by default, the center of the scene is set on the robot).
- The mouse wheel allows you to zoom in or out of the camera.

Timeline Panel

Contains a list of the robot's controlled elements, as well as the movements specified for them. Each added position of the element is bound to a specific period of time.

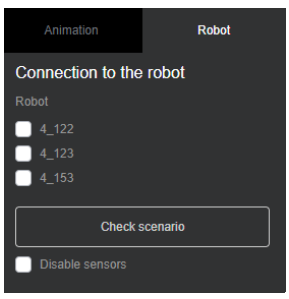


Animation Panel



Contains the position (state) settings of the selected robot element. The panel contains sliders to adjust the selected element to the desired position, the values can also be entered manually. Next to the input field, a range of valid values is specified.

Robot Panel



It contains an interface to connect to the robot to load the script into the robot's memory, for the purpose of its subsequent execution.

The "Robot" column contains a list of robots available for connection. By marking the checkboxes in front of the robot numbers, you can select several robots to upload at the same time.

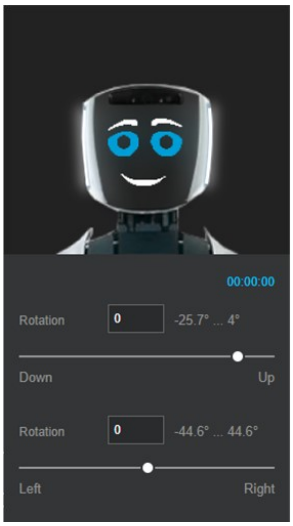
The "Check Script" button allows you to perform a mandatory test of the created script before uploading it to the robot. During the test, all the added actions are verified for correctness.

5. Customizing items

Different elements have their own settings on the **Animation** panel, below is their description for each element:

Head

The following settings are available for the head:



Up and down rotation: indicated by a slider and sets the angle of rotation of the head relative to the horizontal axis.

Left and right rotation: indicated by a slider and sets the angle of rotation of the head relative to the vertical axis.

Facial expressions: are indicated by selecting one of the facial expressions presented on the panel, to specify it is necessary to click on the icon of the required facial expression. The selected emotion is displayed on the head image, at the top of the **Animation** panel.

Backlight: is to be specified by the color in **HEX** format or using the palette when you click on the color. The selected highlight color is displayed on the head image, at the top of the **Animation** panel.

Arms

Each arm consists of four elements. The item settings are similar for both arms. The elements of the arm, on the Timeline panel are in the drop-down list, to display or hide them, just click on the name of the arm.

Arm elements consist of:

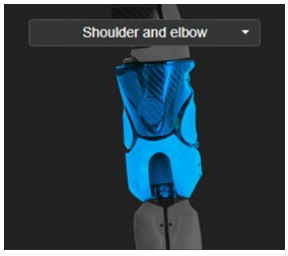
Shoulder joint

The following settings are available for the shoulder joint:

Counter and clockwise rotation: indicated by a slider and sets the angle of rotation of the shoulder joint.

Up and down movement: indicated by a slider and sets the angle of rise of the shoulder joint.

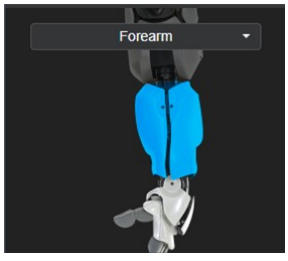
Shoulder and elbow



The following settings are available for the shoulder-elbow joint:

Counter and clockwise rotation: is regulated by a slider and sets the angle of rotation of the shoulder-elbow part of the arm.

Forearm

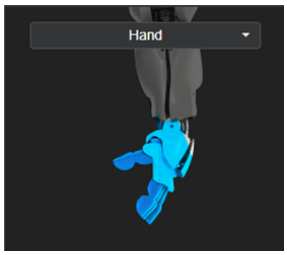


The following settings are available for the forearm joint:

Counter and clockwise bending: is regulated by a slider and sets the angle of the arm bending.

Rotation up and down: indicated by a slider and sets the angle of rotation of the forearm.

Hand

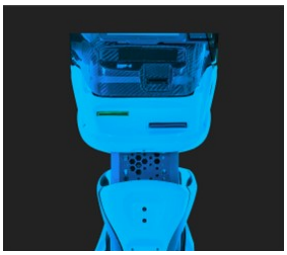


The following settings are available for the shoulder hand:

Counter and clockwise movement: is regulated by a slider and sets the angle of the hand bending.

Bending up and down: is regulated by a slider and sets finger clutching.

Torso



The following settings are available for the torso:

Forward and backward bending: is regulated by a slider and sets the angle of the torso bending forward or backward.

Bending left and right: is regulated by a slider and sets the angle of the torso bending to the left or right.

The height of the torso up and down: is regulated by a slider and sets the angle of rise of the torso in cm.

Music

Available after adding an audio file to the project. You can set the length of a music track by capturing the end of the music rectangle and then moving it to the desired point in time.

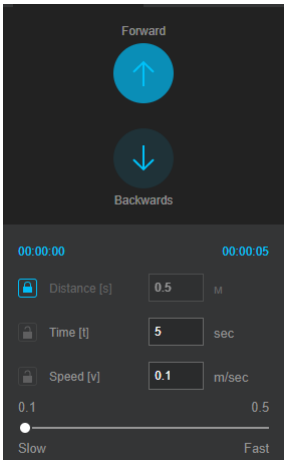
You can add only **one** file.

The "Music" item in the "Timeline" panel and how to change it

Motion

The robot is powered by drives located in the bottom part of the robot. Maximum driving speed is 0.5 m/s. The interface provides a setting for straight-line traverse and rotation around its axis.

Movement



The following settings are available for motion:

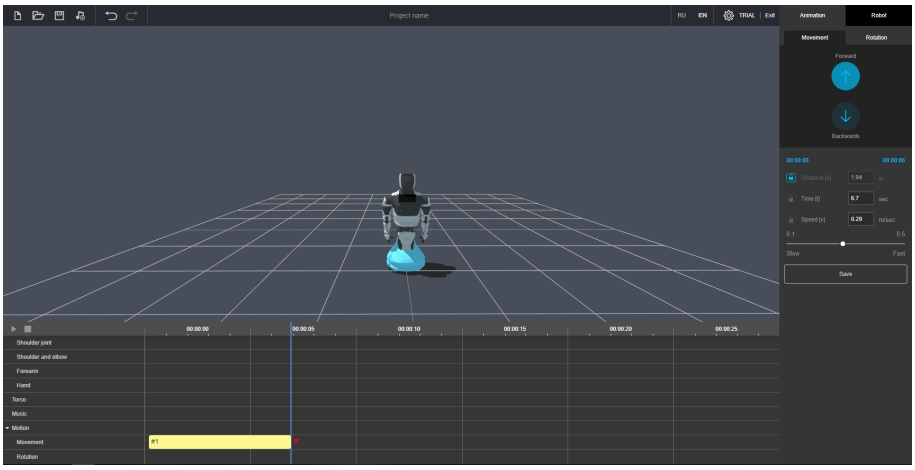
Setting the direction of the motion of the robot. It is set by selecting the desired "arrow".

Distance [s]: is indicated by a slider or by entering the number of meters in the value field.

Time [t]: is indicated by a slider or by entering the number of seconds in the value field.

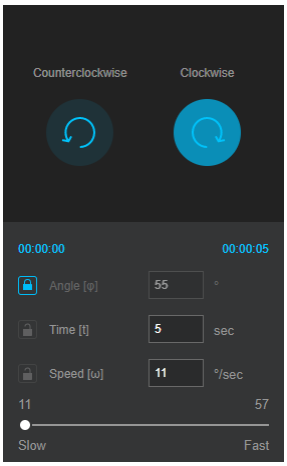
Speed [v]: is indicated by a slider or by entering the number in m\sec from the allowed range in the value field.

The "lock" sign indicates a fixed value. You can fix one of three values. Relative to the set and fixed values in the field, the other two will be calculated and set.



The movement of the robot will be shown in the display window using a 3D model.
The blue line indicates the path that the robot will take.

Rotation



The following settings are available for rotation:

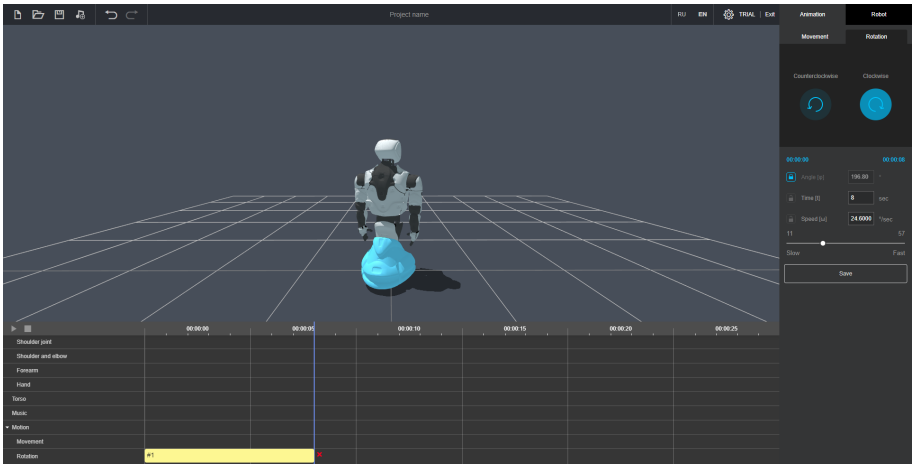
Setting the direction of the rotation of the robot. It is set by selecting the desired "arrow".

Angle [ϕ]: is indicated by a slider or by entering the number of meters in the value field.

Time [t]: is indicated by a slider or by entering the number of seconds in the value field.

Speed [ω]: is indicated by a slider or by entering the number in °\sec from the allowed range in the value field. The maximum speed of rotation is 57 °\sec.

The "lock" sign indicates a fixed value. You can fix one of three values. Relative to the set and fixed values in the field, the other two will be calculated and set.



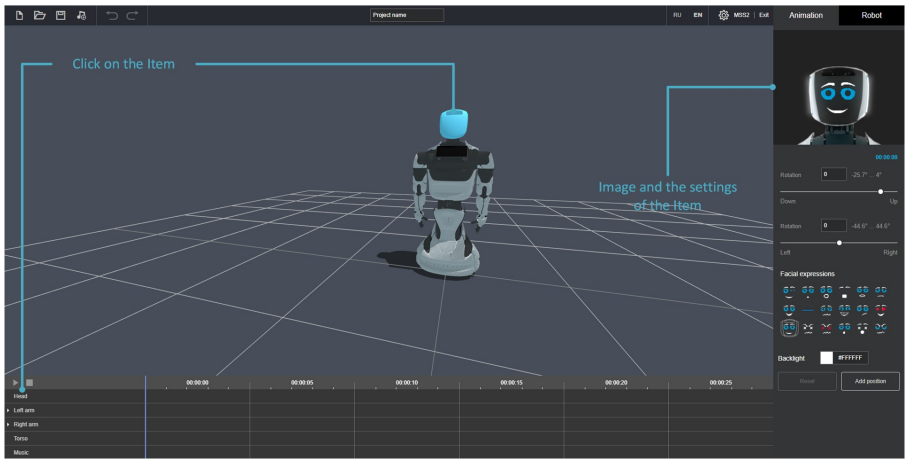
The rotation of the robot will be shown in the display window using a 3D model.
Adding the rotation action, the robot will change the direction on the screen.

6. Adding movement

Movement is the position of a certain element for a given period of time.

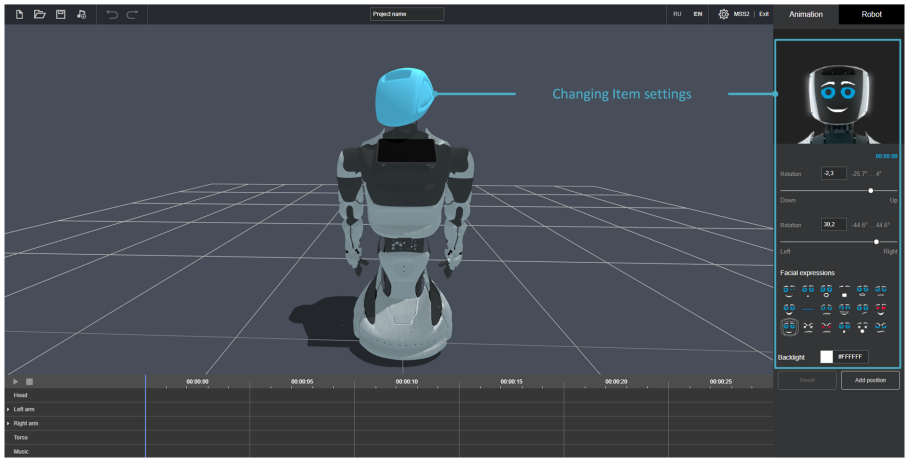
To add a new movement, follow these steps:

- Select the element for which you want to add movement in the **Timeline** panel or directly in the 3D model. When you select an element on the 3D model, it will be highlighted in blue, and its image and settings will appear on the **Animation** panel.



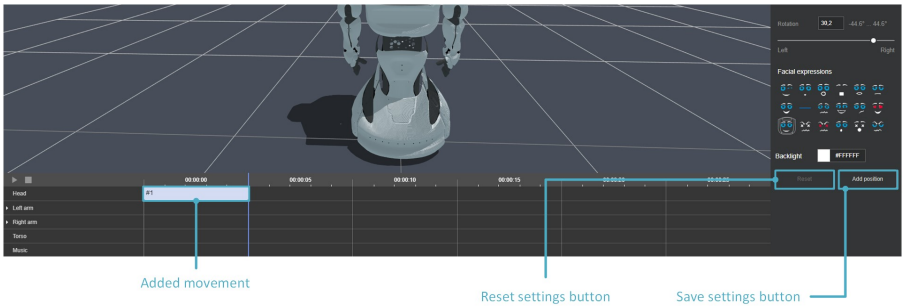
Example of the selected item

- Using the settings on the **Animation** panel, adjust the position (state) of the element. The position of the element is interactively displayed on the 3D model.



Example of making changes to item settings

- Save the position (state) settings by clicking the **Add position** button on the **Animation** panel.



The buttons on the Animation toolbar and movement addition result

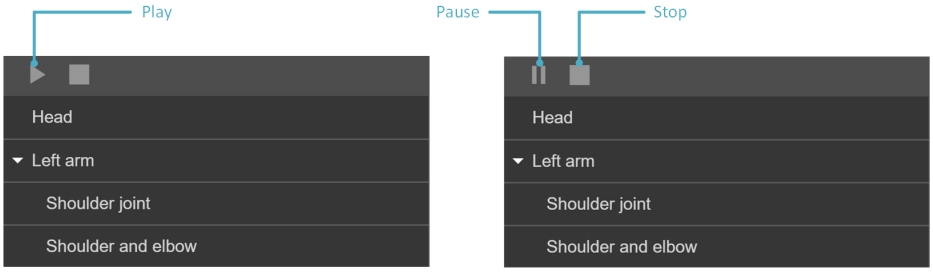
To undo your changes, click the **Reset** button.

7. Editing movements

Editing is done by controlling the elements on the **Timeline** panel. The panel allows you to perform the following actions with movements:

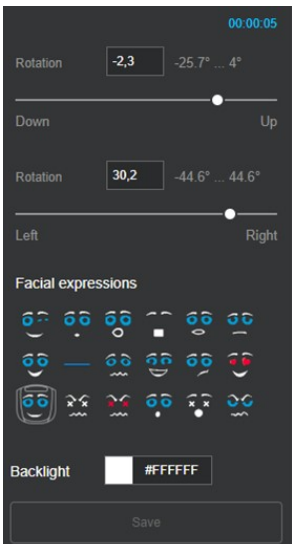
Execution

In the upper left part of the **Timeline** panel there are playback control buttons. The "**Play**" button starts the script execution, and the movements are displayed on the 3D model. You can stop the execution by pressing the "**Pause**" button. The "**Stop**" button resets the execution to the starting position.



The buttons that control the script execution

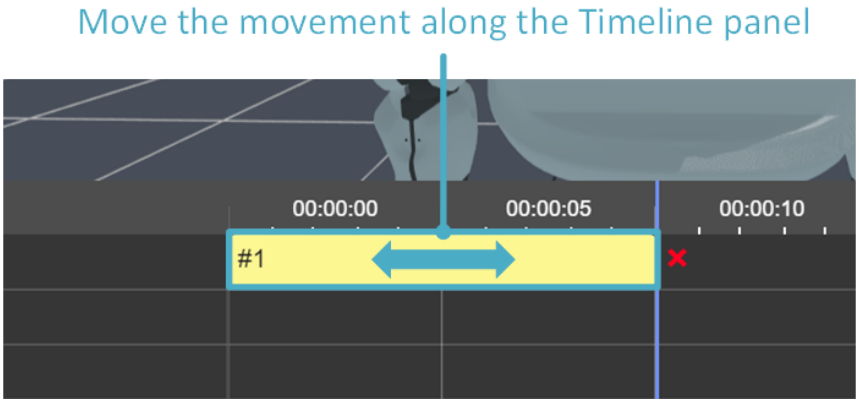
Editing



When you select the desired motion, the **Animation** panel opens the element for which the motion is set. For example, if we select the rotation movement for the **Shoulder joint** element, the right side of the panel opens the **Shoulder joint** of the corresponding hand. This panel displays the values that this movement has. You can adjust the position by changing the slider and click "**Save**".

Changing time of execution

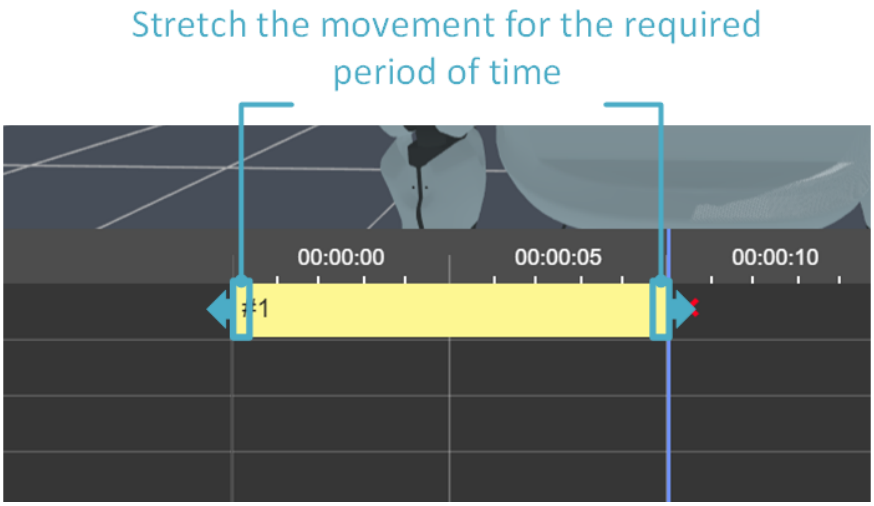
When you select the desired movement, it is possible to move it on the **Timeline** panel in a horizontal direction, thereby changing the time of its execution in the script. To change the execution time, click the move and drag it horizontally to the desired point in time.



Moving the motion at the panel

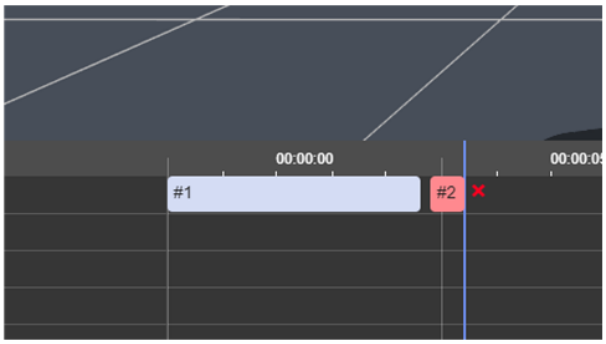
Changing duration of execution

When you select the desired movement, you can stretch or compress it on the timeline, in order to speed up or slow down the movement. To stretch or compress a movement, click one of its edges and drag to stretch or compress, respectively.



Changing time of execution

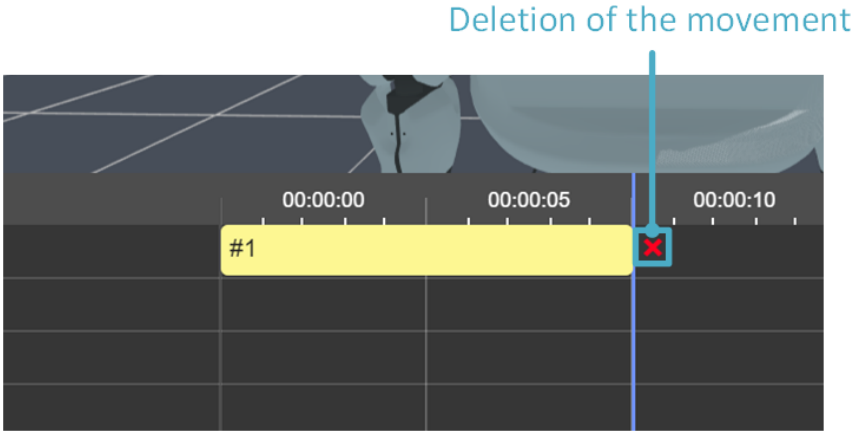
When changing the duration of the movement, pay attention to the physical limitations of the robot. If the speed is not selected correctly, the movement will be highlighted in red.



Movement #2 is not set correctly

Deleting

To remove an item from the **Timeline** panel, select it and then click the **Delete** button or the red cross symbol. In this case, the next element pulls the initial value from the previous one.



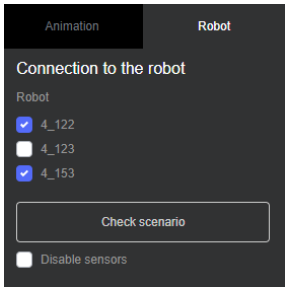
Removing motion from panel

Copying

To copy an element, select it and press **Ctrl+C**, and then put the mouse pointer on the timeline in an empty space and press **Ctrl+V**. Currently, you can only copy items one at a time.

8. Launching the script on the robot

To execute the created script on the robot, follow these steps:

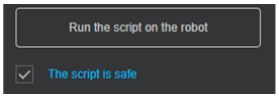


• Switch to the Robot tab, and then mark one or more robots on which you want to upload the script. **Only robots for which you are the owner are available for upload. If the robot you are using is not in the list, please contact Promobot technical support.**

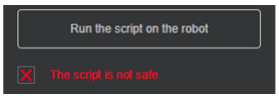
• If the script should not be interrupted when the sensors are triggered, select the "Disable sensors" option.

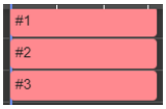
Use this option at your own risk!

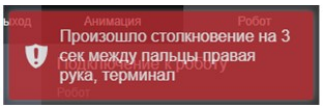
• Click the "**`Test script`**", then the test will begin execution of the script. During the test, the robot emulates the execution of the script taking into account the physical limitations of the robot.

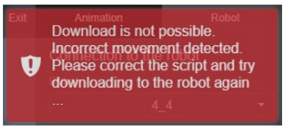


• If the test is successful, the message "**`Script is safe`**" will appear, after which you can run the script on the robot. However, if unsafe movements of robot elements are detected during the check, the "**`Script is not safe`**" will appear, at the same time, a notification will appear explaining when the collision occurred. The movements that caused the collision will be highlighted in red in the **`Timeline`** panel. To re-check the script, you need to correct the selected movements.

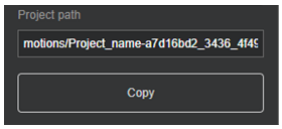








• Click the "**run script on robot**" button. When you try to upload a script with incorrect movements, a pop-up notification will appear.



• Once the script is uploaded, the robot will start executing the script. Besides, after loading the script the path to the script on the robot will appear. Click the Copy button to copy the file path to the clipboard.

The copied path can be used in the web interface of linguistic database to add the created script to the rule or phrase. To do this, in edit mode, click on the "Action" field (**1**), then specify the "script" in the action, adding a link to the script from the clipboard (**2**) to it. **Press the `Enter` key** to confirm the addition of the action, then click on the save button (**3**) of the rule or phrase.