# MOXI Player User Guide

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## Release Notes

**v.0.25.10 release data: 08/13, 2025**

- Performance optimization (removed logs).

**v.0.25.9 release data: 08/07, 2025**

- Added a default model MOXI_Robot_N_FBX.
- Adjusted the UI.

**v.0.25.8 release data: 08/05, 2025**

- Added a foot constraint option to the configuration file.
- Adjusted the UI.

**v.0.25.7 release data: 08/01, 2025**

- Fixed an issue with reading hand orientation information from character configuration files.
- Added a feature: when connected to a BL_Mode device via USB, the update page will automatically pop up.
- Added an FPS display setting in MOXIConfig.
- Support for Japanese gloves.
- Fixed an issue where the default model appeared as NV Robot.

**v.0.25.6 release data: 07/25, 2025**

- Added a feature for Foot Constraint
- Added a setting to specify the update mode for retrieving Motion Data
- Modified the time parameters for MXS file recording
- Fixed an issue where VRM character movement could not be transferred to other VMC software
- Fixed an issue when the SDK detects an automatic disconnection (e.g., unplugging USB), the character's motion did not return to the initial state.

**v.0.25 release data: 06/30, 2025**

- Improved the issue where the MOTi/MOXI device would jitter up and down when rotated to a specific angle.
- Integrated and fixed data transmission issues between version 0.24 and the Transponder
- Fixed incorrect battery level display for left and right foot on MOTi devices
- Fixed the issue where MOTi device battery level showed as 101%
- Added a feature to return to the participant selection page
- Fixed an issue where recording multi-user files would fail if the action lasted over 10 minutes (Currently, the maximum duration for a single action recording is limited to 10 minutes; recordings longer than that will still only save the first 10 minutes)

- Added display of animation recording time
- Added a warning message when recording exceeds 36,000 frames and automatically stops recording.
- Default avatar changed to FBX format
- Updated user guide

**v.0.24 release data: 06/10, 2025**

- Improved the issue where the MOTi/MOXI device would jitter up and down when rotated to a specific angle.
- Optimized the running and jumping functionality.
- Updated user guide

**v.0.23 release data: 06/04, 2025**

- Add default avatar
- Added a UI toggle to control whether the feet leave the ground when sitting.
- Fixed some bugs

**v.0.22 release data: 05/29, 2025**

- Supports the sit-down and sliding feature
- Compatible with j-mex V100 device
- Fixed some bugs

**v.0.21 release data: 05/15, 2025**

- Add running and jumping feature
- Support StretchSense gloves
- Updated user guide
- Fixed some bugs

**v.0.20 release data: 05/07, 2025**

- Using the initial version of the new MOXISDK
- Output the full skeleton for the Export FBX feature
- Fixed some bugs

**v.0.19 release data: 04/24, 2025**

- Interface adjustments
  - Added device information interface
  - Added firmware update function
  - Added error message popup windows
- Updated user guide

- Fixed some bugs

**v.0.18 release data: 04/15, 2025**

- Interface adjustments
  - Added Motion calibration diagram
  - MOXI Player window size settings
  - Colors of the Connect and Disconnect buttons
- Fixed some bugs

**v.0.17 release data: 04/01, 2025**

- Fixed the issue where the avatar character appeared to be floating.
- Fixed the issue that prevented importing VRM 1.0 models.
- Fixed the display issue with the Avatar database.
- Hid the Firmware Update button.
- The Calibration button will no longer be shown when no device is connected.
- Updated the User Guide document.

**v.0.16 release data: 03/20, 2025**

- Display software version
- Modify the data transmission section to correspond with the new iClone Receiver

**v.0.15 release data: 02/28, 2025**

- Reduce the frequency of UDP broadcast signals when connecting to the j-mex device, changing it to once per second to minimize transponder crashes.

**v.0.14 release data: 02/11, 2025**

- Fixed an issue where models with scaling caused incorrect movement scaling.
- Fixed the Unreal Receiver chaining functionality

**v.0.13 release data: 01/23, 2025**

- Fixed the skeleton and root node setup to address the issue of the character lying down.
- Removed the mandatory root node selection for the Hip in Skeleton Mapping. Now, the correct Hip skeleton node can be selected, and the system will automatically search for the root node object within the skeleton.

**v.0.12 release data: 09/09, 2024**

- Automatically check and fix the root bone mapping to the HIP device ID.

**v.0.11 release data: 06/20, 2024**

- Provide functions to send data via VMC protocol.

- Enhance network connection stability

**v.0.10 release data: 06/11, 2024**

- Provide the multiple floor contact feature.
- Fix the delay in restarting motion capture.

**v.0.9 release data: 05/20, 2024**

- Enhance network connection stability.
- Modify the format of motion data being sent to the MOXI Receiver for general use.

**v.0.0 release data: 04/03, 2024**

- release *MOXI Player* scene

## Introduction

The *MOXI Player* is an application developed using the *MOXI SDK Unity Plugin*. It is designed to receive motion capture data from the *j-mex* IMU-based motion capture device by directly connecting to the hubs of the *j-mex* motion capture device or by connecting to the *MOXI Connect Mobile App* via networking. Additionally, it sends data to other applications that use the *MOXI Receiver Plugin*.

Within the player, users can import avatars and select one for use. Upon connecting to the *j-mex* IMU-based motion capture device, the player animates the selected avatar and sends the motion data in real-time to the application using the *MOXI Receiver Plugin* via networking.

An important note to consider is that the avatar used in the *MOXI Receiver Application* must have the same skeleton structure and name as the one in the *MOXI Player Application*. Therefore, it is recommended to use the same model file for the avatar used both in the *MOXI Player* and application. Currently, the *MOXI Player* only supports character files in the *FBX and VRM* formats.

## Network Environment Limitation

Please note that the *MOXI Player*, *MOXI Connect Mobile App, and any application* utilizing the *MOXI Receiver plugin* must operate within the same network environment, as they rely on the same local network to communicate with each other.

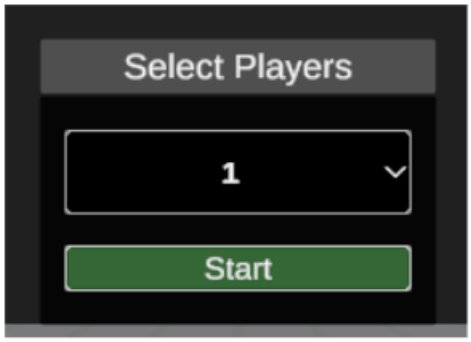
## User Guide

### 1. Setup MOXI Player

- Use *Unity Hub* to open the 'UnityMOXIPlayer'.

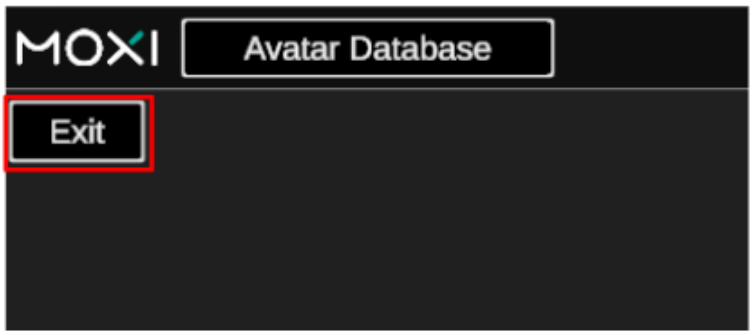
### 2. *MOXI Player* Unity Scene


- All assets of the *MOXI Player* are located in the 'MOXIPlayer' folder within the *Unity* project.
  - After starting the scene, the game view is displayed as shown below. Users can then select the number of players they want to use. Recently we support up to 4 characters in maximum.

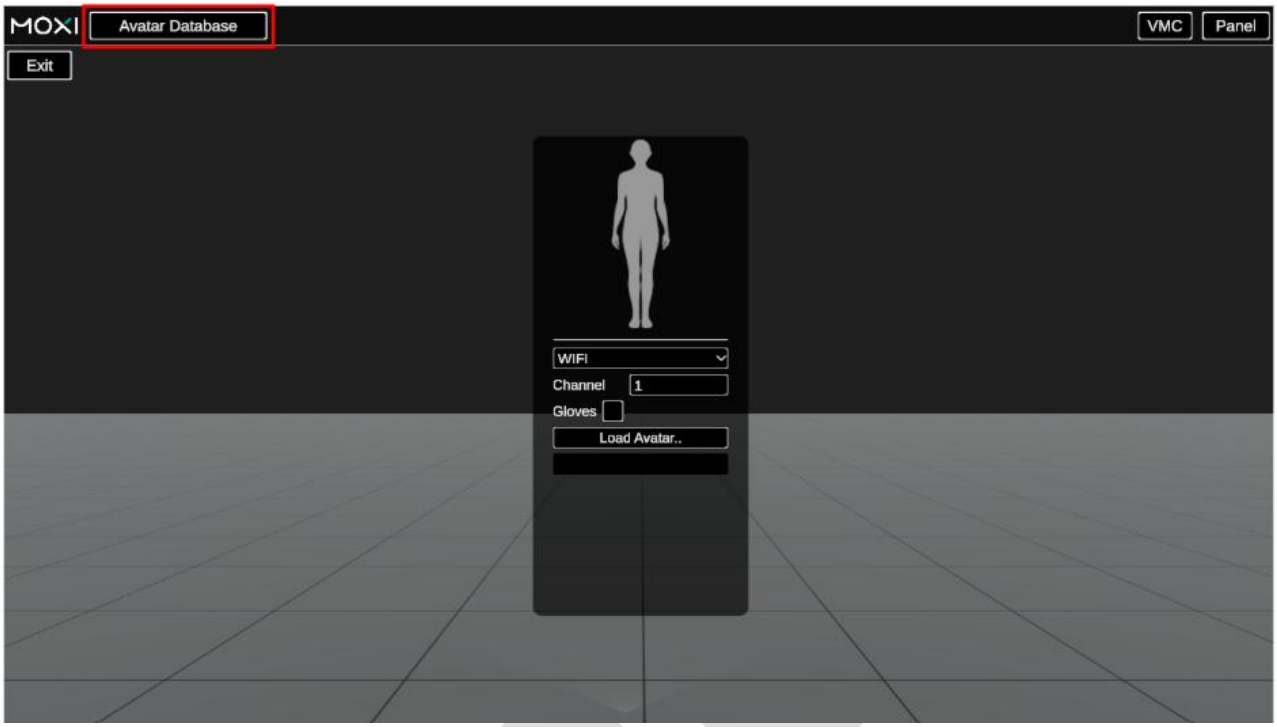




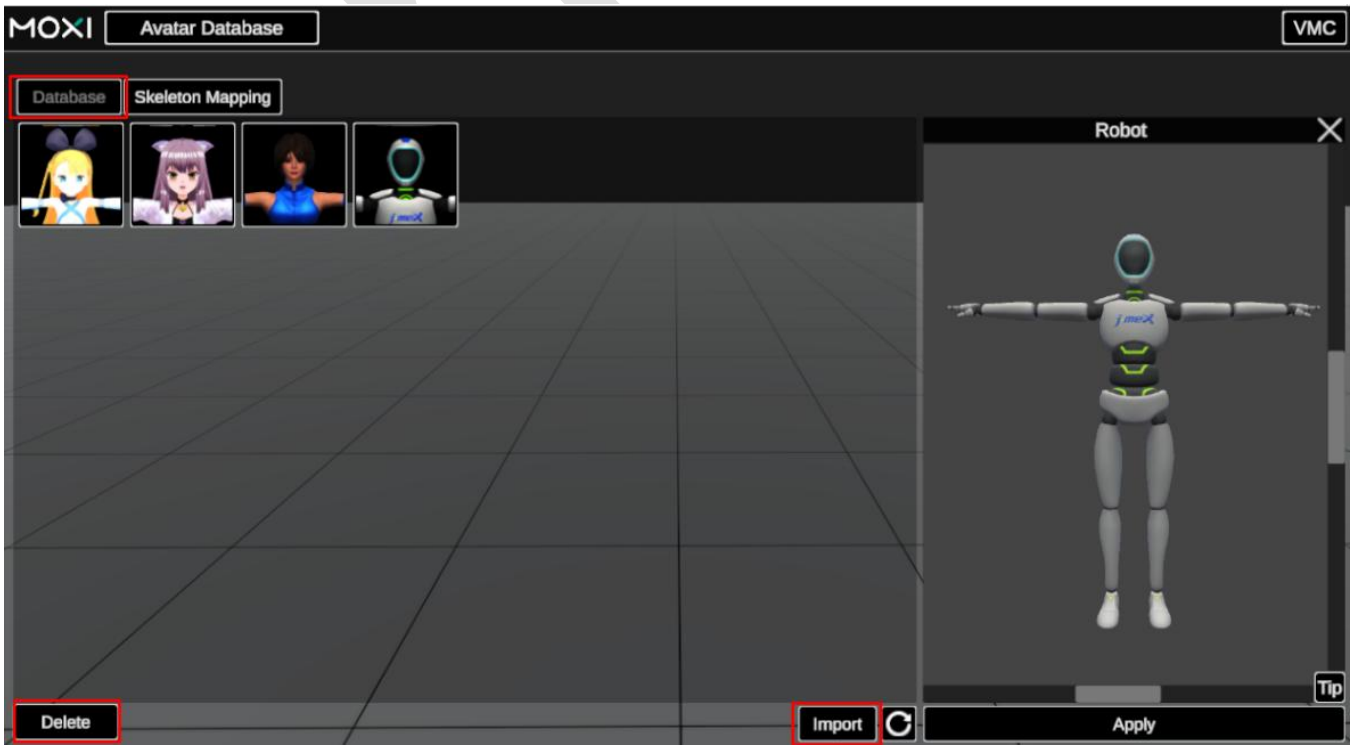
  - After clicking the 'Start' button above, users can return to the player number selection panel by clicking the 'Exit' button in the editing panel, as shown below.



## 3. Avatar Database



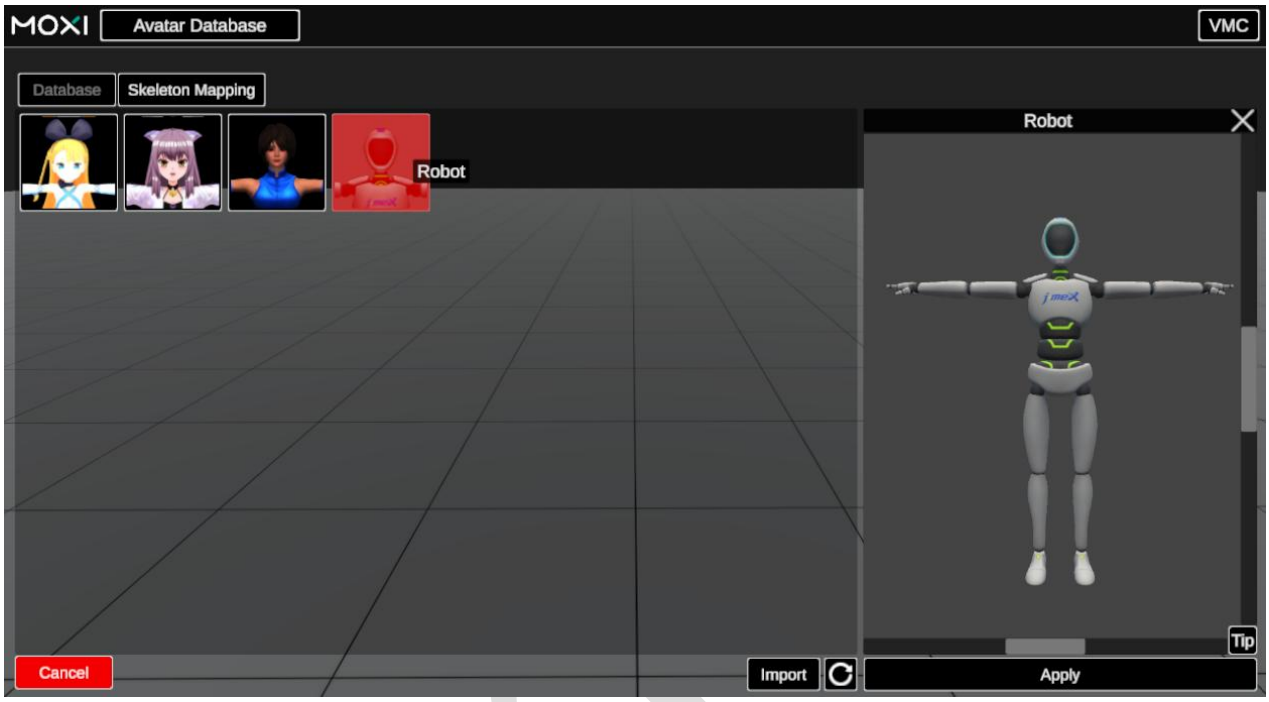

- Click the "Avatar Database" button to open the avatar database page. Here, users can import character models in the *FBX* file format and establish the relationship between bone joints of characters and *MOXI* controllers.




- Database Page
  - Import

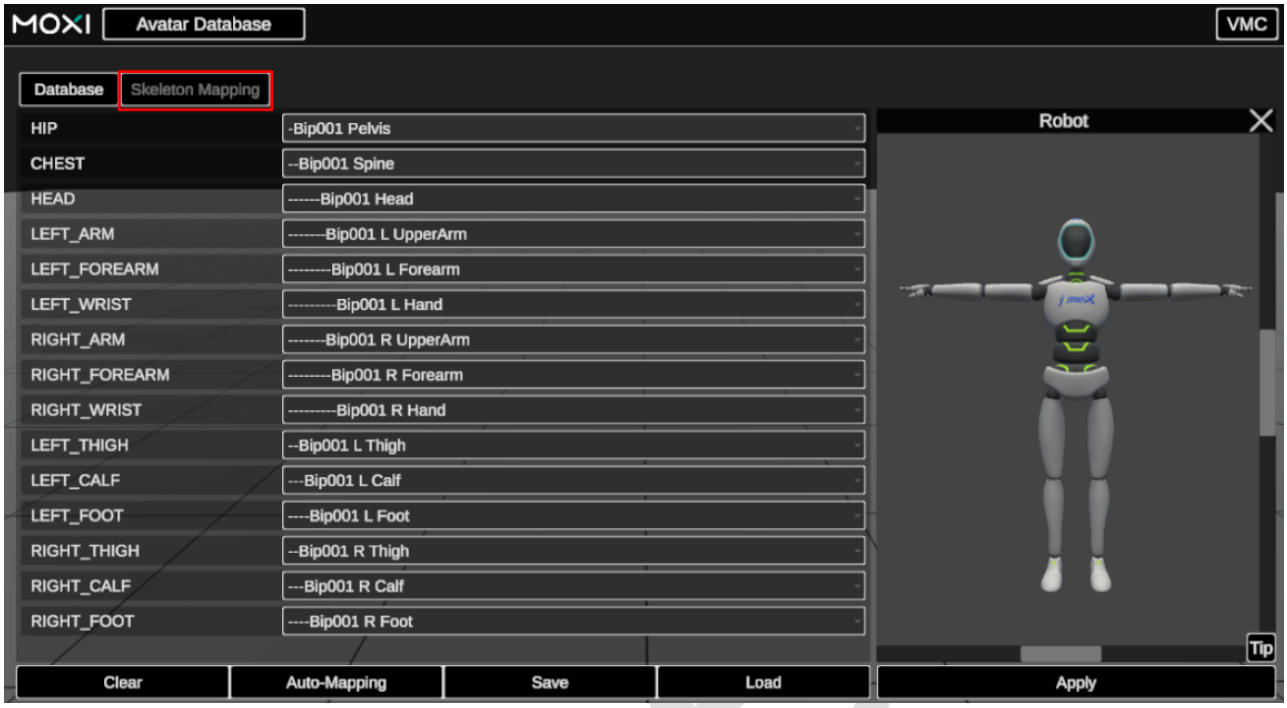
- Open a file dialog to select and import an *FBX* character file. After importing, the icon of the character will be displayed on the database page..

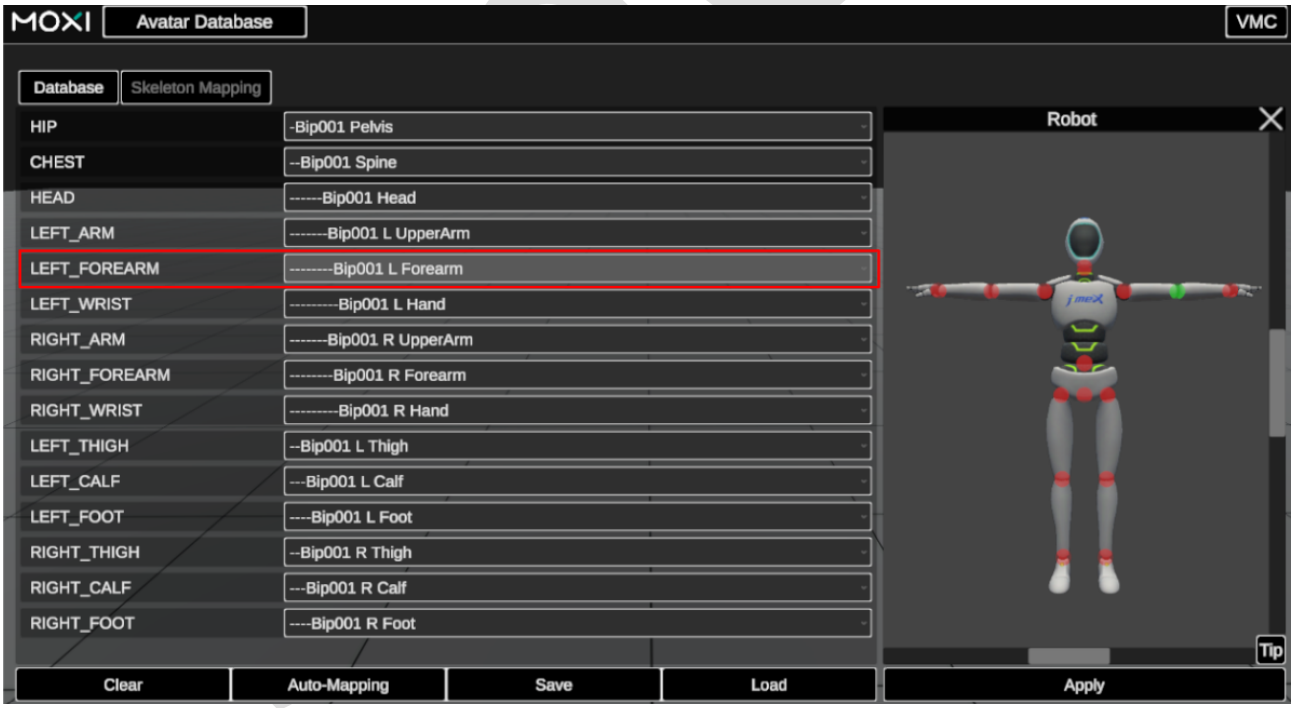
- Delete



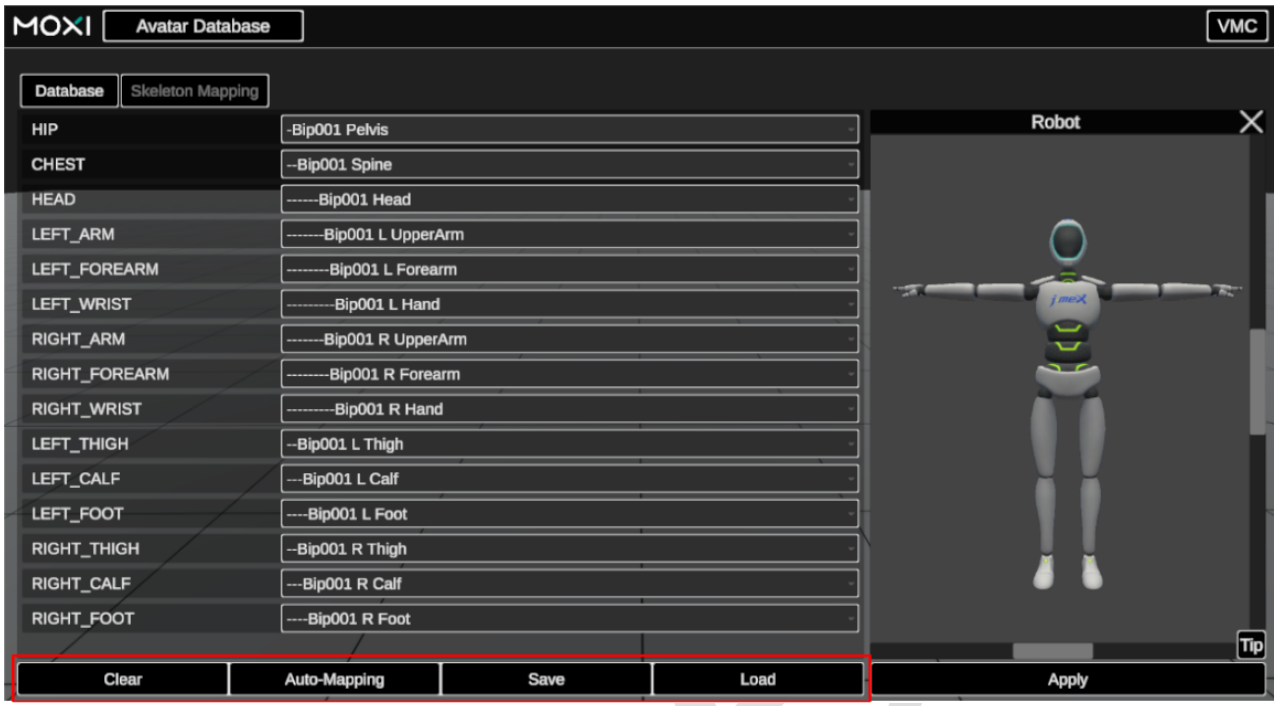

- Clicking will activate the delete character mode. In this mode, clicking 'Cancel' will exit the delete mode, and clicking on the character icon will delete the corresponding character.

- Skeleton Mapping Page
  - The UI used for assigning the *MOXI* controllers to the bone joints of the target avatar
  - The item names are the official name of the *MOXI* controllers, which are defined in `MOXI.h` in the *MOXI SDK*.
  - The value of each item is the assigned bone joint name of the target avatar.



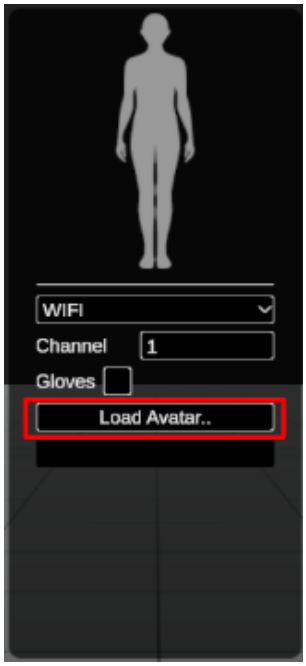




- Tip
  - Clicking the "Tip" button will show or hide the display of tip images for the bone joints on the selected avatar in the viewer.
  - The “Tip” button is located on the right-bottom corner of the avatar view.
  - After selecting an item on the Skeleton Mapping Page, the corresponding bone joint in the viewer will turn green.

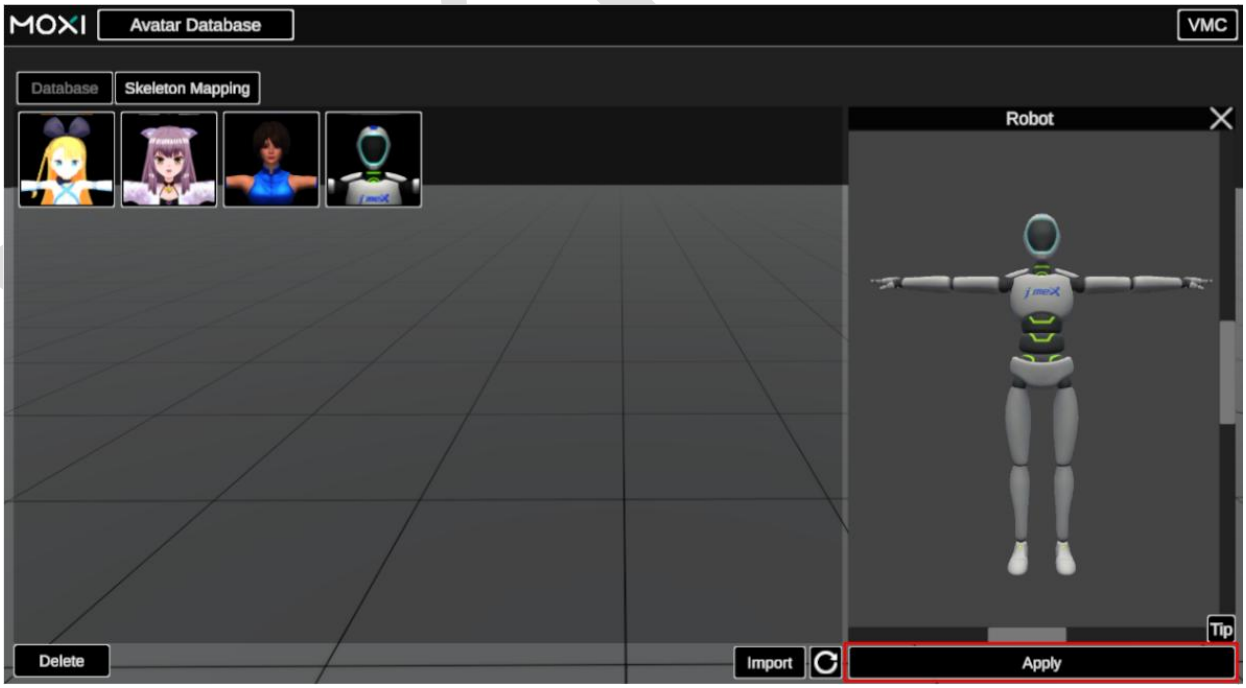



- Clear
  - Remove all bone joint value settings on the Skeleton Mapping Page.
- Auto-Mapping
  - Automatically assign bone joints to their corresponding values according to the Humanoid Avatar System in *Unity*.
- Save
  - Save the edited skeleton mapping data along with the selected avatar in the avatar database.
- Load
  - Load the skeleton data into the currently edited avatar.

4. **Select an avatar for use**




- Click the "Load Avatar.." button will also open the avatar database page, where an "Apply" button will appear as shown below..




- "Click the "Apply" button selects the avatar to use in the application.

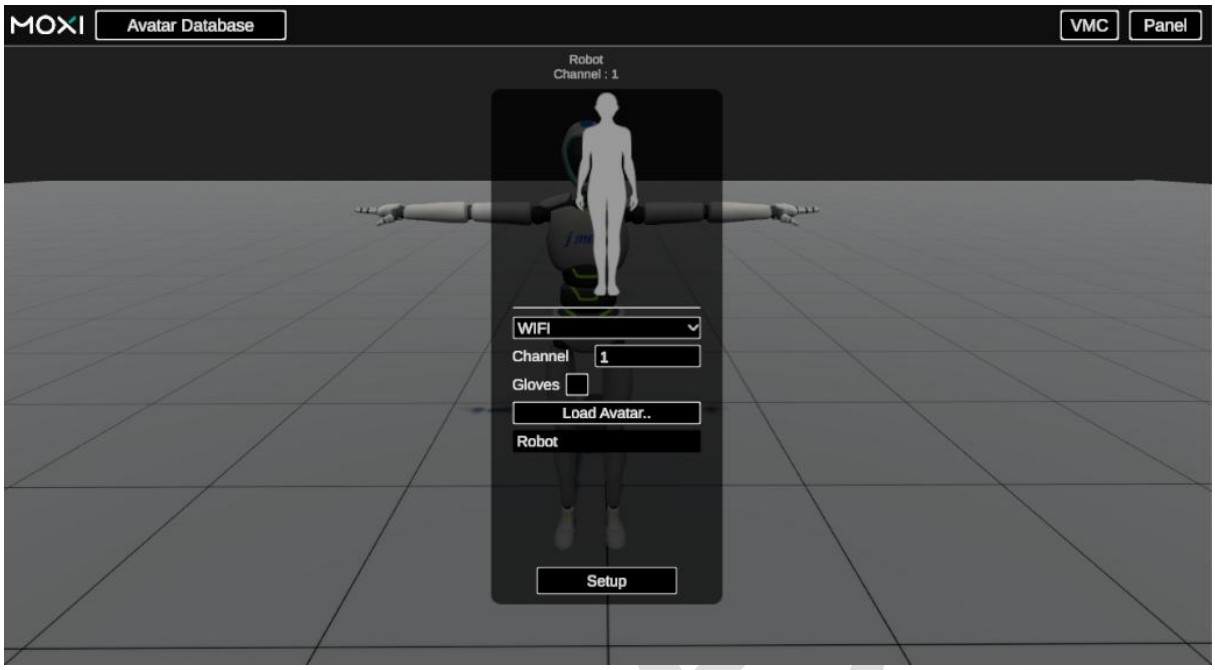
- After selecting the avatar, its name will be displayed on the UI.

### 5. Set up the VMC Protocol (Optional)

- Click "VMC" button to open the setting panel, as shown below.

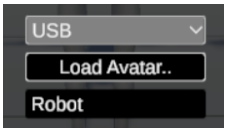

- Input the IP Address and Port number for a channel ID

## 6. Tutorial of initializing the devices before doing the motion capture



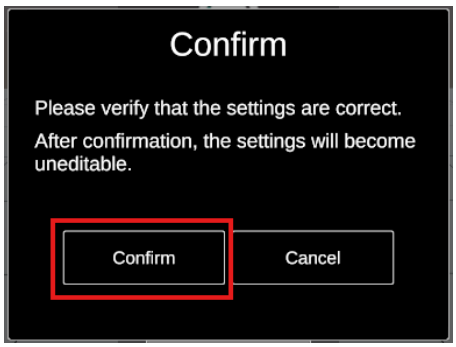

- Step 1 : Select the connection method on Connect UI


- Select the connection protocol : WIFI or USB


- Assign a channel ID(WIFI mode)
- If gloves usage is enabled, the system currently supports connecting to only one pair of StretchSense gloves. The port number must also be set to match the configuration in the StretchSense HandEngine application.
- It is also necessary to ensure the fingers are set up correctly on the Skeleton Mapping page.
- Click "Setup" button to be ready to start the initialization

Before initializing, please double-check that the settings are correct. Once confirmed, click the "Confirm" button.



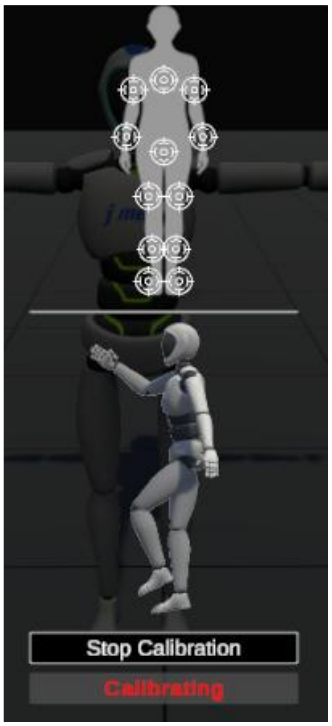
- Step 2: Select the connection method on Connect UI


- Click "Connect" button to connect to the *MOXI* devices
  - If the system is connected successfully, The plugin will open the “Calibration” button for next step.
- Click "Reset" button to back to the previous step.

- Step 3 Perform the calibration process


- Click "Calibration" button to do the hardware calibration.
  - Please refer the calibration step for more information.
- Check "Dynamic Terrain" to control whether the performer can sit on the chair with their feet off the ground. This option can also be modified during motion capture.
- If the system completes the calibration job, the user can click the “Capture” button to the final step.

- Calibration Step:



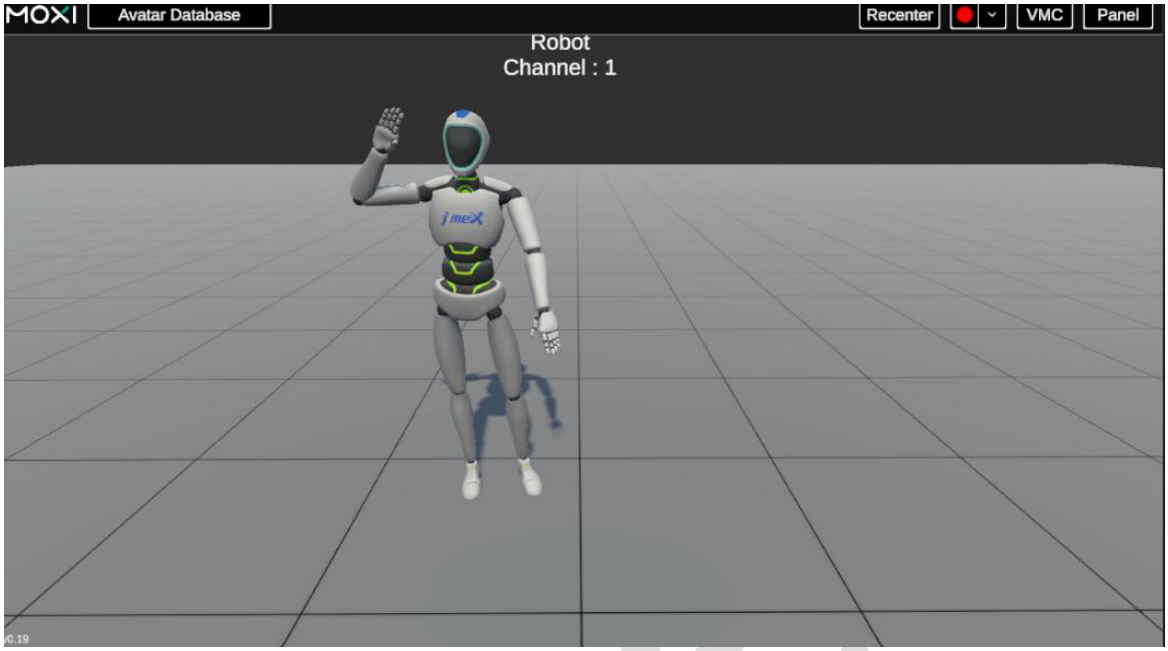

Calibrating devices on your body by moving and rotating the body parts until the target icon becomes green. Then can go to the final step.


- Final Step : setup the natural pose of the target avatar


- Click "Setup Pose" button start the job of setting up the natural pose
- Before pressing the button, the user should ask the performer to perform the same pose of the target avatar in natural pose (also known as a T-pose). The system will record the pose as the rest pose of the motion capture. Be sure to have the same pose as the target avatar to get the better mocap result.
- The system will automatically move to motion capture mode after setting up the natural pose.

- If there is no response, you can click the 'Panel' button to open the settings panel and disconnect the device.

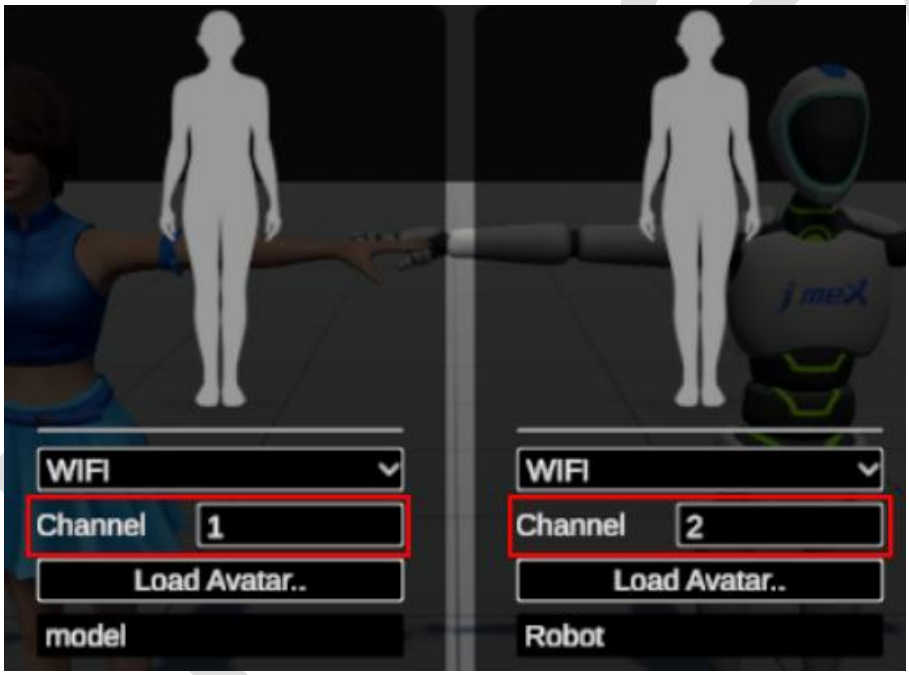
## 7. Control View



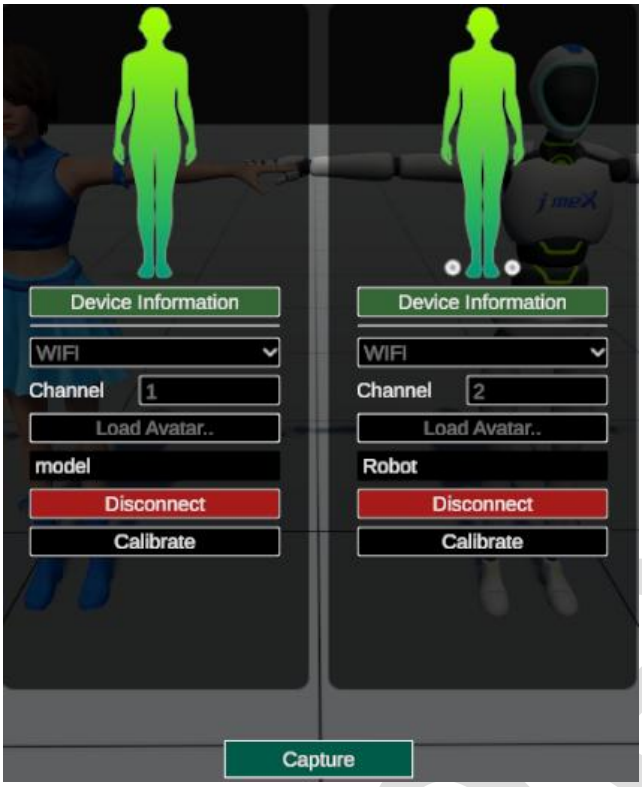

- Press WASD on the keyboard to move the view.
- Press Q to descend, press E to ascend
- Press Left Shift to accelerate movement.
- Right-click the mouse to rotate the view.

## 8. Multiple Users

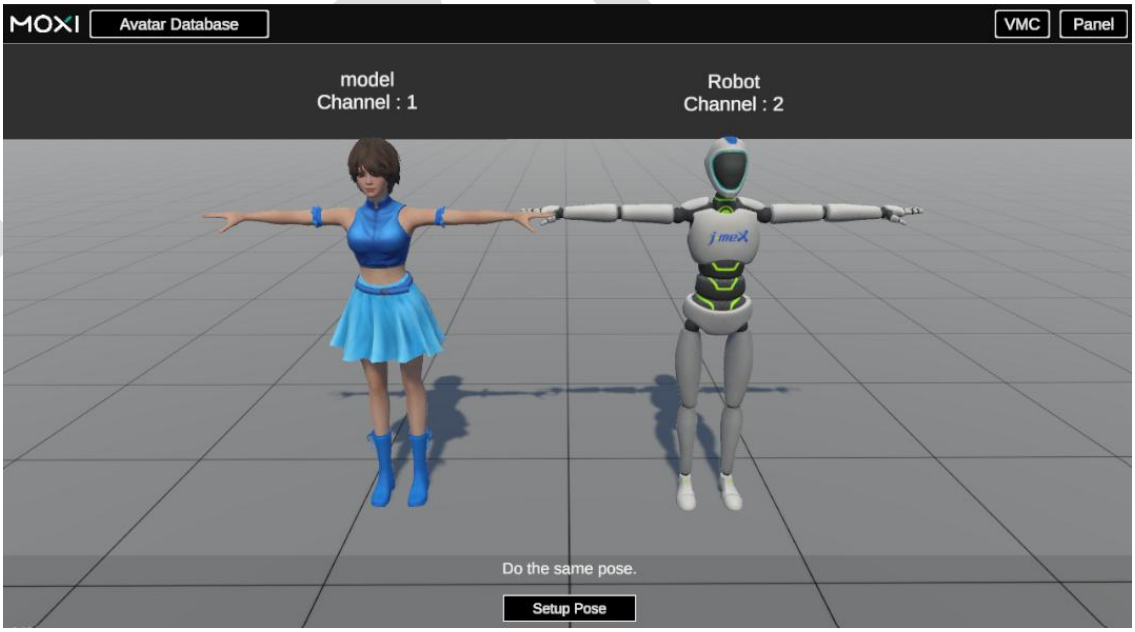

- Currently, the MOXI Player supports motion capture for 1 to 4 users simultaneously. Please take note of the following usage guidelines.



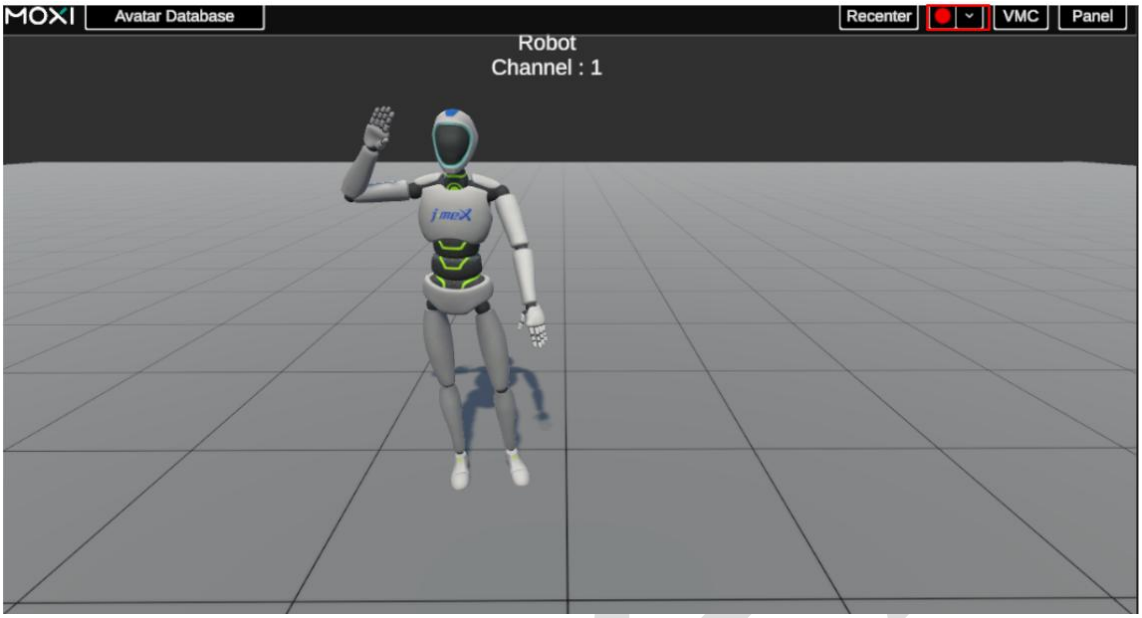

- Ensure that the Channel ID is correctly mapped to the corresponding motion capture device, and make sure the IDs are not duplicated.
- The capture button is displayed after all the players are connected.



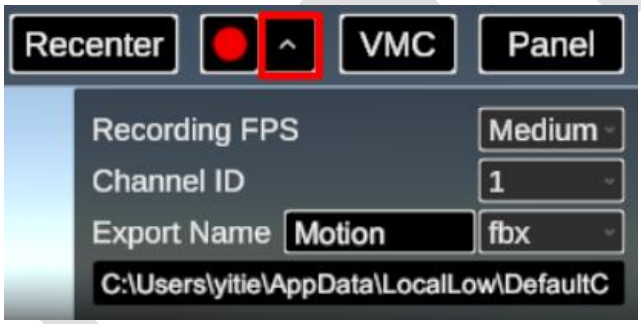

- All the players perform the final setup pose together.



## 9. Tutorial of recording the *i-mex* device or motion data

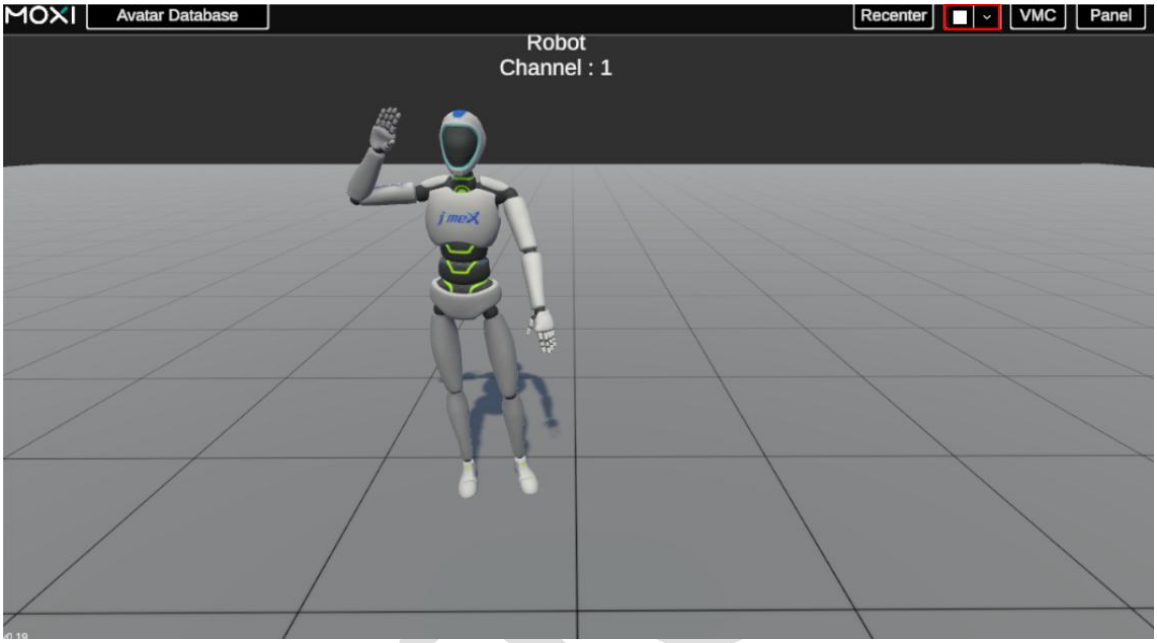



- Record button with pull-down menu :
  - On the top of menu bar, there is a button with red dot, which is used for recording. Beside the button, there is a pull-down menu button to open a pop-up user interface to specify the recording functions.



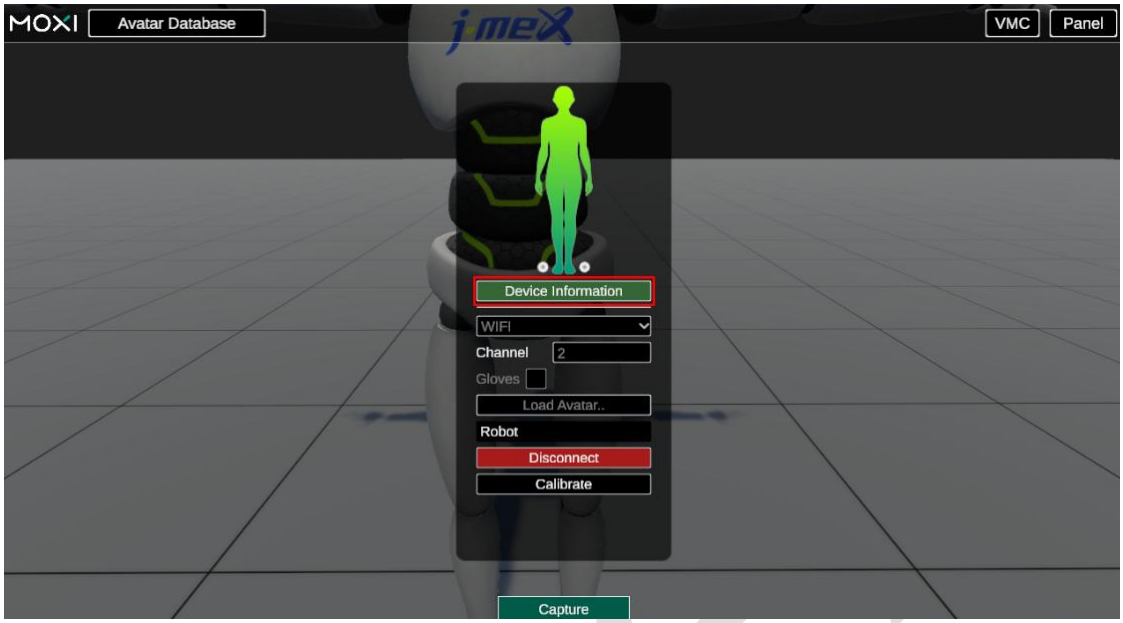

  - The user interface is to set the recording frame rate, the channel ID, the file name and the type of motion data. The following image shows the layout of the user interface.
  - The recording job is running in another thread, of which the recording frame rate can be set independently to the rendering frame rate. There are three levels of frequency supported recently: High (100 fps), Medium (60 fps), and Low (30 fps).
  - The toolkit supports to record three types of motion data:
    - *Autodesk FBX* format for the full-body motion: indicates as the selection of ‘fbx’ on the user interface.
    - *Biovision BVH* format for the full-body motion: indicates as the selection of ‘bvh’ on the user interface.
    - *j-mex MXM* format for the raw device data: indicates as the selection of ‘mxs’ on the user interface. To know the MXS format, please contact the technical support team of *j-mex*.

- Record button (the red dot button)
  - Hit Record button to record the motion data to the file.
  - Hit the Stop button to stop the recording. The Stop button is shown as a white square button.

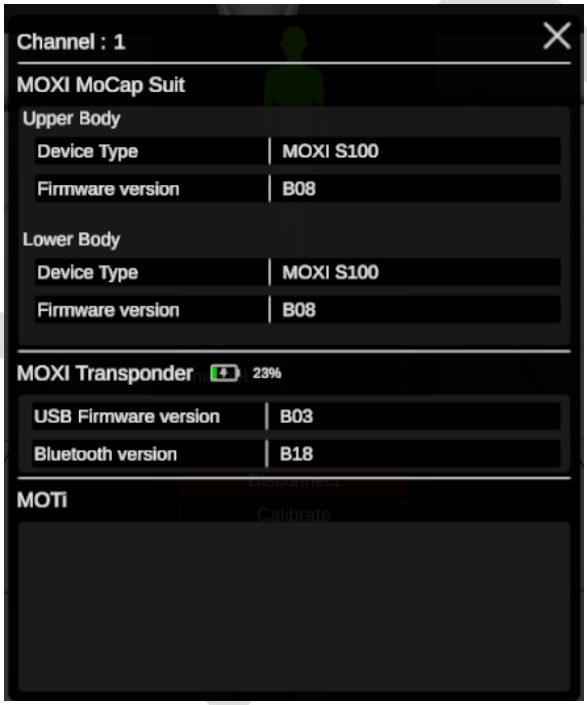



- Panel button :
  - On the top of menu bar, there is a Panel button for users to turn ON or OFF the user interface to disconnect the devices.

## 10. Device information

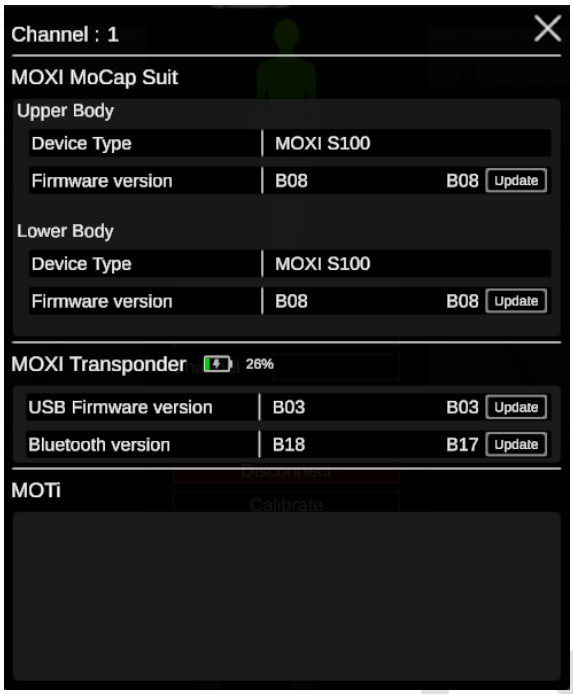



- Click the "Device Information" button to open the information panel of the connected device, as shown below.



## 11. Firmware Update

- Click the "Device Information" button to open the information panel for the connected device. If a new firmware version is available, the Update button will disappear, as shown below.




- Click Update button to update firmware for each device.
- Follow the instruction of the browser to complete the update job.