# Motion AI Manual v1.0.0

#### Introduction

Features Overview
Self-research Armature Transfer Algorithm
Advanced AI Technology for Motion Capture
Rig IK/FK System
Self-research Fine-Tuning Algorithm
Bake Animation
Remapping
Download the Plugin
Install Motion AI
Update Motion Al
Quick Start - Create New Capture
Setup
Rig
Capture
Tune
Export
Quick Start - Fine Tune Old Capture Result
Rig
Tune
Export
Quick Start - Remap Animation
Remap
Panel Overviews and Usage Instructions
Setup Panel
Rig Panel
Capture Panel
Tune Panel

Remap Panel Export Panel Troubleshooting Inaccurate Capture Data Bone Matching Errors Plugin Crashes or Unresponsiveness

# Introduction

#### Motion Al: The Complete Motion Capture Solution for Blender

Motion AI is designed to streamline your motion capture workflow, offering powerful features that integrate seamlessly within Blender.

#### **Key Features:**

**Fully Integrated**: Perform all your motion capture tasks within Blender—no need for additional software.

Versatile Compatibility: Effortlessly supports motion capture for any T-pose or A-pose armature.

Advanced Technology: Leverage cutting–edge AI and post–processing optimization for highly accurate motion capture results.

**Minimal Workflow**: Capture motion in as few as 10 clicks, with a simplified, user-friendly interface.

Quick Learning Curve: Get up and running in just 3 minutes with intuitive controls.

Time Efficient: Save up to 80% of the time usually spent setting up poses.

# **Features Overview**

### Self-research Armature Transfer Algorithm

Effortlessly supports motion capture for any T-pose or A-pose armature.

## Advanced AI Technology for Motion Capture

Leverage cutting–edge AI and post–processing optimization for highly accurate motion capture results.

# Rig IK/FK System

Play with your animations like a pro! Our IK/FK control system help you tune the motion capture result quickly.

### Self-research Fine-Tuning Algorithm

Two fine-tuning algorithms are provided to deal with the problems of toe and foot optimization.

### **Bake Animation**

Once the animation is baked, you can easily share your motion capture results with your collaborators.

# Remapping

Easily copy animations from other motion capture sources to your own models.

### Download the Plugin

Obtain the Motion Al from the Blender Market.

## **Install Motion Al**

1. Open Blender -> Edit > Preferences > Add-ons.

₩ndo         Ctrl Z         dd         Object           Bedo         Shift Ctrl Z         Undo History         Image: Ctrl Z         Image: Ctrl Z		Shading Animation Rendering Compositing	Kov Sce □ ⊕ ● ● ● ○ ○ ↓ Options ↓
Actust Last Operation F9   Repeat Last Shift R   Repeat History F3   Operato Search F3   Batch Renne Cti F2   Each Renne Cti F2   Cock Object Modes   Preferences	Interface        P Search        Viewport        >	o - Rig Pro Vision Motion Capture (BVH) format epack V2 epack V2 ey Global Transform cites Render Engine x set format f 2.0 format f 2.0 format epicols citiNations	

2. Install from Disk -> Select the MotionAl.zip file

🔊 Blender Preferences	- 0	×
Interface	Search Add-ons Enabled Only	♡ ⊻
Viewport	>  Auto-Rig Pro	
Lights	SioVision Motion Capture (BVH) format Install from Disk	- 10
Editing	> 🗹 Cinepack V2	
Animation		
Get Extensions	> Copy Global Transform	ক
Add-ons	> ✔ Cycles Render Engine	ক
Themes	> 🗹 DMX	
Input	> 🗹 Faceit	22
Navigation	> ☑ FBX format	ক
Keymap	> ☑ glTF 2.0 format	ক
System	> 🗌 Hydra Storm render engine	ক
Save & Load	> ☑ Light Wrangler	22
File Paths	> 🗌 LoopTools	<u></u>
Experimental		
	> 🗹 MACHIN3tools	
	>  Manage UI translations	ক
	> 🗹 MotionAI	*

3. Enable the Add-on

🔊 Blender Preferences		
Interface	> 🗌 LoopTools	<b>4</b> %
Viewport	> 🗹 MACHIN3tools	-
Lights	>  Manage UI translations	ক
Editing		
Animation	V 🗹 MotionAI	2%
Get Extensions	Motion Capture for Blender.	
Add-ons	Website Contactional.tech	
Themes	Type Extension Maintainer Lianheng Tech Co., Ltd.	
Input	Version 1.0.0	
Navigation	File C:\Users\Administrator.DESKTOP-Cde_development\MotionAI	initpy
Кеутар	Preferences	
System	Update	
Save & Load	Check for Update	
File Paths		
Experimental	> 🗹 Node Wrangler	ゐ
	> 🗹 Pose Library	ゐ
	> 🗌 RetopoFlow	
_≡	>      Rigify	ক

- 4. Open the Motion Al Panel and Install Dependencies
- 4.1. Press N on your keyboard or click the small arrow on the right side of the Blender interface to open the sidebar.
- 4.2. In the sidebar, find and select the Motion Al panel.
- 4.3. Motion AI will perform an environment check to ensure the dependency is set up correctly. If any required modules are missing, you will see an option to Install them. Click on this to automatically download and install the necessary requirements.

$\sim$ MotionAI Installation		
Please install the missing	ng requirements for MotionAl	
Requirement	Installed	Description
cv2	True	opencv for rnd cameras
mediapipe	False	mediapipe for motion ca
	Install Requirements	
	-20-50	

# **Update Motion Al**

- 1. Open Blender -> Edit > Preferences > Add-ons.
- 2. Find Motion Al -> Check for Update

👌 Blender Preferences	— C	x c
Interface	> 🗋 LoopTools	<b>4</b> %
Viewport	> 🗹 MACHIN3tools	
Lights	>  Manage UI translations	ক
Editing	V V MotionAI	<u>.</u> *
Animation	Motion Capture for Blender.	
Get Extensions		
Add-ons	Website 🕀 motional.tech Type Extension	
Themes	Maintainer Lianheng Tech Co., Ltd.	
Input	Version 1.0.0	
Navigation	File C:\Users\Administrator.DESKTOP-Cde_development\MotionAI\	initpy
Keymap	Preferences	
System	Update	
Save & Load	Check for Update	
File Paths		
Experimental	> 🗹 Node Wrangler	ক
	> 🔽 Pose Library	ね
	>      RetopoFlow	
	> 🗌 Rigify	ね

# **Quick Start – Create New Capture**

#### WorkFlow: Create New Capture

To start using Motion AI, follow the steps below:

### Setup

Motion AI provides the motion capture for the LH armature or your own armature.

#### a. Create New LH Armature

If you need a standard LH armature, simply click the "Create New LH Armature" button.

$\vee$ MotionAI						
Setup	Rig	Capture	Tune	Remap	Export	
∨ Setup						
	(	Create New	LH Armature			
Use Existing Armature						

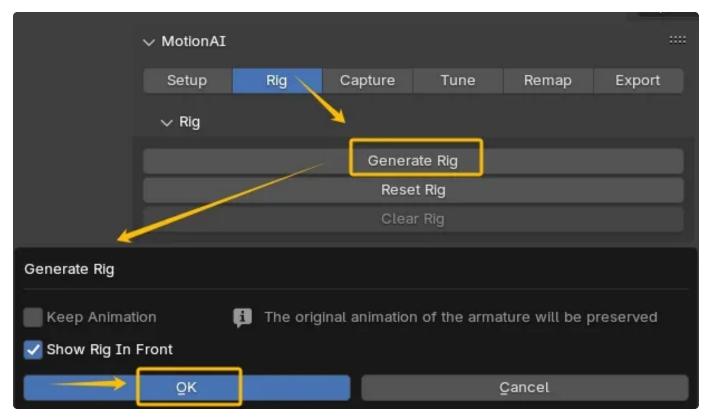
#### b. Use Existing Armature

- 1. Properly import your own armature using Blender Import Backend.
- 2. Select your armature and go to setup tap.
- 3. Click the "Use Existing Armature" button.
- If your armature follows the standard of mixamo, arp, ue5 mannequin etc., you can click the "Load Bone List" Button and load the corresponding bone relation. If not, please fill the bone list manually.
- 5. Click the "Transfer to LH Armature"

	$\sim$ MotionAI					
	Setup	Rig	Capture		Remap	Export
	√ Setup					
			Create New	LH Armature		
		2	Use Existin	ng Armature		
	Step 2: Populate the I	oone list, then cli	ick the 'Transfe	to LH Armature' but	tton	
	Bone List					
	Head			4		
	Hips LeftShoulder			<b>*</b>		
1. 👗	RightShoulder		3. 🔸	<u>ጉ</u> ፋ		
· · ·	LeftUpperArm		1	*		
	Clear bone list	Load	bone list	Save bone	list Dr	elete bone list
		Load		LH Armature		stete bolle list
7		4	,			
- UL						

# Rig

- 1. In **Object Mode**, select the armature you want to generate the rig for.
- 2. Click the **"Generate Rig"** button to create the rig controller for your armature. **PLEASE** uncheck the keep animation.



# Capture

- 1. Select the input type: video, camera or image
- 2. Select the file path.
- 3. Select the capture type: pose or face. For face capture, please make sure the armature has the ARKit shapekeys.
- 4. Select the target armature.
- 5. Adjust advanced settings. Please view parameter explanation.
- 6. Click "Start" Button.

Input Type:	Video	
Video File Path:	Select the path to the video file	
Capture Type:	Pose	~
Target Armature:	🏷 Object	Þ
Record Keyframe:	✓	

#### Parameter Explanation

- Input Type: Motion AI supports input formats including video, camera, and image.
- File Path: The file path of the input.
- Capture Type: Pose or Face.
- Smooth Coefficient: The larger the smooth coefficient, the smoother the animation will be.
   Recommend Value: 0.3 0.8.
- Horizontal Transform Coefficient: The larger the horizontal transform coefficient, the greater the horizontal transformation of the animation will be. This is typically used to control movement along the x-axis.
- Vertical Transform Coefficient: The larger the vertical transform coefficient, the greater the vertical transformation of the animation will be. This is typically used to control movement along the z-axis.
- Frame Step: the interval of inserted keyframes. Recommend Values: 2 or 4.
- Start Frame: The start frame for inserting keyframes.
- Enable Hand Rotation: Currently, the leading AI motion capture technology has limitations in accurately capturing hand movements. However, you can enable the hand capture feature as an experimental function to test its capabilities.
- Enable Shoulder Rotation: Not every armature can achieve optimal results in shoulder rotation due to variations in geometry. You can enable this feature to evaluate its performance.
- Target Armature: The armature you want to apply motion capture
- Record Keyframe: whether record animation.

Advanced Settings		
Smooth Coefficient:	0.30	
Horizontal Transform Coefficient:	1.00	
Vertical Transform Coefficient:	1.00	
Frame Step:	1	
Start Frame:	< 1	;
Enable Hand Rotation		
Enable Finger Rotation		
Enable Shoulder Rotation		

### Tune

1. Tune the animation using IK/FK control system. It usually involves spending time on manual finger tuning.

- 2. Set a reasonable ground height to optimize foot and toe automatically.
- 3. Click "optimize" button for foot and toe.
- 4. Bake animation.

✓ MotionAI							
Setup	Rig	Capture	Tune	Remap	Export		
∽ Tune							
Control Mode:				FK			
Animation Optimization							
Ground Height			0.00				
Foot Optimization			Optimize				
Toe Optimization			Optimize				
	Bake Animation						

#### Parameter Explanation

• Ground Height: The z-axis value of the ground

### Export

- 1. Select the armature and the mesh you want to export.
- 2. Click "Export FBX" or "Export GLTF" button.

✓ MotionAI					
Setup	Rig	Capture	Tune	Remap	Export
∽ Export					
		Ехро	rt FBX		
		Expor	t GLTF		

# Quick Start – Fine Tune Old Capture Result

#### WorkFlow : Fine Tune Old Capture Result

To start using Motion AI, follow the steps below:

# Rig

- 1. In Object Mode, select the armature you want to generate the rig for.
- 2. Click the **"Generate Rig"** button to create the rig controller for your armature. **PLEASE** check the keep animation.

$\sim$ MotionAI						
Setup	Rig	Capture	Tune	Remap	Export	
∨ Rig						
		Gener	ate Rig			
	Reset Rig					
	Clear Rig					
Generate Rig						
<ul> <li>Keep Animation</li> <li>The original animation of the armature will be preserved</li> <li>Show Rig In Front</li> </ul>						
	ŌΚ			Cancel		

# Tune

- 1. Tune the animation using IK/FK control system. It usually involves spending time on manual finger tuning.
- 2. Set a reasonable ground height to optimize foot and toe automatically.
- 3. Click "optimize" button for foot and toe.
- 4. Bake animation.

✓ MotionAI							
Setup	Rig	Capture	Tune	Remap	Export		
√ Tune							
Control Mode:				FK			
Animation Optimization							
Ground Height		0.00					
Foot Optimization		Optimize					
Toe Optimization		Optimize					
Bake Animation							

Parameter Explanation

• Ground Height: The z-axis value of the ground

## Export

- 1. Select the armature and the mesh you want to export.
- 2. Click "Export FBX" or "Export GLTF" button.

✓ MotionAI						
Setup	Rig	Capture	Tune	Remap	Export	
$\checkmark$ Export						
Export FBX						
Export GLTF						

# **Quick Start – Remap Animation**

#### WorkFlow : Remap Animation

To start using Motion AI, follow the steps below:

### Remap

- 1. Select the source armature : Select the armature that contains the original animation data.
- 2. Select the target armature : Choose the armature you want to transfer the animation to.
- 3. Click the "Remap" button.

✓ MotionAI						
Setup	R	ig	Capture	Tune	Remap	Export
√ Remap						
Only support animation remap for the same type of the armature						
Source Armature:	1.	🏷 Arma	ture.002			×
Target Armature:	2.	2. 🄆 Armature >				
Customize Remap Range						
			3. Rer	nap		
3. Remap						

#### Parameter Explanation

- Source Armature Range : Defines the frame range to remap. Set the "Start Frame" and "End Frame" to specify the range (e.g., frame 5 to frame 90).
- Target Armature Range : The "Start Frame" in the target armature sets where the keyframes will begin. You can set this to any frame for flexibility.

 Smooth Coefficient: The larger the smooth coefficient, the smoother the animation will be. Recommend Value: 0.3 – 0.8.

Customize Remap Range		
	Start Frame	End Frame
Source Armature Range:	1	2
Target Armature Range:	1	
Target Armature Range:	1	

# Panel Overviews and Usage Instructions

### **Setup Panel**

The Setup panel ensures that your armature adheres to the LH standard, whether you are creating a new LH armature or transferring your existing armature.

∽ MotionAI							
Setup	Rig	Capture	Tune	Remap	Export		
∽ Setup							
Create New LH Armature							
	Use Existing Armature						
Step 2: Populate the I	3 Step 2: Populate the bone list, then click the 'Transfer to LH Armature' button						
Bone List							
Head			4				
Hips			<b>\$</b>				
LeftShoulder			<b>\$</b>				
RightShoulder			<b>\$</b>				
LeftUpperArm			<b>\$</b>				
•							
Clear bone lis		Load bone list	Save bone list	t [	Delete bone list		
Transfer to LH Armature							

#### Function

- 1. Create a New LH Armature
  - Click "Create New LH Armature" button.
- 2. Convert an Existing Armature to LH standard
  - Click "Use Existing Armature" button.
  - Select your armature.
  - Fill in the blanks of the bone list. Load the bone list from presets or manually fill in the blanks. You can manage your preset bone lists using the "Save Bone List" and "Delete

Bone List" buttons.

Click "Transfer to LH Armature" Button. V1.0.0 only support T–pose or A–pose armature.
 More improvements will be included in future versions.

#### Tips

- 1. For Using an Existing Armature
  - If you frequently use certain bone setups, it's recommended to save the bone list for quick loading in the future.
  - Make sure your model is adjusted to a T-pose or A-pose to avoid pose issues later.
  - If you frequently use certain bone setups, it's recommended to save the bone list for quick loading in the future.

# **Rig Panel**

The Rig panel handles the control system of the armature.

✓ MotionAI						
Setup	Rig	Capture	Tune	Remap	Export	
√ Rig						
Generate Rig						
Reset Rig						

#### Function

- 1. Generate Rig
  - Select your armature.
  - Click "Generate Rig" button.

#### 2. Reset Rig

- Select your armature.
- Click "Reset Rig" button.
- 3. Clear Rig
  - $\,\circ\,$  If your armature has LH rig system, select your armature.
  - click "Clear Rig" Button

#### Tips

- 1. For Clear Rig
  - ° Clearing the rig will remove all LH rig-related data. Use this function carefully, and

## **Capture Panel**

The Capture panel contains the core function—motion capture. Advanced parameters can be adjusted to achieve better capture results.

✓ MotionAI						
Setup	Rig	Capture	Tune	Remap	Export	
✓ Capture						
Input Type:	Video				~	
Video File Path:					-	
Capture Type:	Pose				~	
Target Armature:	🔆 Armatu	re			×	
Record Keyframe:	≤					
Advanced Settir	ngs					
Smooth Coefficient:			0.00			
Horizontal Transform Coe	efficient:		1.00			
Vertical Transform Coeffi	cient:		1.00			
Frame Step:			1			
Start Frame:			1			
Enable Hand Rotation	≤					
Enable Finger Rotation						
Enable Shoulder Rotation						
Start						
Clear Animation						

#### Function

- 1. capture
  - Fill in the parameters and click the "Start" button. Parameter explanations are listed below. Parameters in the advanced settings are optional.
    - Input Type: Motion AI supports input formats including video, camera, and image.
    - File Path: The file path of the input.
    - Capture Type: Pose or Face. For face capture, please make sure the armature has the ARKit shapekeys.
    - Smooth Coefficient: The larger the smooth coefficient, the smoother the animation will be. Recommend Value: 0.3 – 0.8.
    - Horizontal Transform Coefficient: The larger the horizontal transform coefficient, the greater the horizontal transformation of the animation will be. This is typically used to control movement along the x-axis.

- Vertical Transform Coefficient: The larger the vertical transform coefficient, the greater the vertical transformation of the animation will be. This is typically used to control movement along the z-axis.
- Frame Step: the interval of inserted keyframes. Recommend Values: 2 or 4.
- Start Frame: The start frame for inserting keyframes.
- Enable Hand Rotation: Currently, the leading AI motion capture technology has limitations in accurately capturing hand movements. However, you can enable the hand capture feature as an experimental function to test its capabilities.
- Enable Shoulder Rotation: Not every armature can achieve optimal results in shoulder rotation due to variations in geometry. You can enable this feature to evaluate its performance.
- Target Armature: The armature you want to apply motion capture
- Record Keyframe: whether record animation.
- 2. Clear animation: clear the animation of the target armature.

#### Tips

- 1. For Capture
  - Make sure the input format (video, camera, or image) is compatible with the selected Motion AI capture type for smooth processing.
  - These features are experimental. If the results are unsatisfactory, try adjusting your armature or testing with different models for improved accuracy.
- 2. For Clear animation
  - Before clearing animations, save your project to avoid losing any progress that might need to be restored later.

### **Tune Panel**

The Tune Panel assists in optimizing the capture results.

✓ MotionAI					==		
Setup	Rig	Capture	Tune	Remap	Export		
√ Tune							
Control Mode:				FK			
Animation Optimization							
Ground Height		0.00					
Foot Optimization		Optimize					
Toe Optimization		Optimize					
Bake Animation							

#### Function

- 1. Change control mode
  - select your armature.
  - $\,\circ\,$  click IK or FK in control mode to switch control system.
- 2. Foot and toe optimization
  - select your armature
  - Set a reasonable ground height to automatically optimize the positioning of the foot and toe. The ground height should correspond to the z-axis value of the ground.

#### 3. Bake animation

- select your target armature.
- click bake animation

#### Tips

- 1. For foot and toe optimization
  - Ensure the ground height is accurately set according to the z-axis value of your scene's ground for best results in foot placement.

### **Remap Panel**

The Remap panel facilitates copying animations from existing capture results.

✓ MotionAI						
Setup	Rig	Capture	Tune	Remap	Export	
∨ Remap						
🔋 Only support animation	on remap for the same typ	e of the armature				
Source Armature:	🏷 Object				ø	
Target Armature:	🎘 Object				R	
Customize Remap I	Range					
	Start Frame		End	Frame		
Source Armature Range:	<	1	>	2		
Target Armature Range:		1				
Remap						

#### Function

- 1. remap
  - Select the source armature that contains the existing animation.
  - Select the target armature to which you want to copy the animation from the source armature
  - (Optional) Click "Customize Remap Range" button to set the remapping range.
  - Click "Remap" button.

#### Tips

- 1. For remap
  - Ensure that both the source and target armatures have compatible bone structures for optimal remapping results. Incompatible structures may lead to unexpected animations.
  - Use the "Customize Remap Range" feature to focus on specific sections of the animation, allowing for more controlled adjustments during the remapping process.

## **Export Panel**

The Remap panel facilitates the export of animations to FBX or GLTF formats.

✓ MotionAI						
Setup	Rig	Capture	Tune	Remap	Export	
$\checkmark$ Export						
Export FBX						
Export GLTF						

#### Function

1. Export FBX

- Select your armature and the corresponding mesh
- Click "Export FBX" button.
- 2. Export GLTF
  - Select your armature and the corresponding mesh
  - Click "Export GLTF" button.

# Troubleshooting

A Journey Through Challenges

### Inaccurate Capture Data

Imagine setting up your camera to capture a perfect performance, but when you review the footage, something feels off. To correct this, ensure your camera angle captures the action accurately and your lighting illuminates the scene evenly. Adjust the capture parameters, like tweaking the frame rate or sensitivity, to get the precise data you need.

# **Bone Matching Errors**

Imagine a complex puzzle where the pieces just don't seem to fit—this is similar to encountering bone matching errors. Verify that the bone system you're using matches the captured data. If the pieces still don't align, use manual adjustment tools to fine-tune the bone mapping until everything fits perfectly.

## **Plugin Crashes or Unresponsiveness**

If you're on the verge of a breakthrough and your plugin crashes or becomes unresponsive, first ensure that both Blender and the plugin are up to date, as outdated versions could be causing the issue. If the problem continues, try uninstalling and reinstalling the plugin to give your setup a fresh start and resolve any underlying problems.