

Humanoid

- [Humanoid !\[\]\(1207edb9a08751d3d55970560645ed23_img.jpg\)](#)
- [BaseModel !\[\]\(d7a34a706cfa4ef37c62a369101e1b36_img.jpg\)](#)
- [HumanoidComponent](#)
- [UniHumanoid](#)

Humanoid



VRM の Humanoid の Forward kinematics(FK/)

の ()

- hips()
-

の Gltf Scene の Unity Hierarchy

- の Gltf Node の Unity GameObject
-
- => T-Pose

VRM の

Unity の HumanoidAvatar

<https://docs.unity3d.com/Manual/AvatarCreationandSetup.html>

VRM の Humanoid

- の Gltf Node (Unity GameObject) 0
-

XYZ

T-Pose



-
- XZ() Z45

Unity Humanoid

`Unity` `"Avatar"` `"Humanoid"` `Avatar` `fbx importer(fbx)` `Humanoid Avatar fbx`

`Avatar` `Humanoid Avatar` `Humanoid component` `Avatar`

BVH

☒ T-Pose ☐ BVH ☐ ☐ ☐ ☐

- hips
- hips



Unity [HumanBodyBones](#)

- [GLTF](#) [skin](#) [joint](#) [Unity](#) [SkinnedMeshRenderer](#) [Bones](#)
- [Humanoid](#)
- [Humanoid](#) [LowerLeg](#) [UpperLeg](#)
- [hips](#) [Root](#) [Bones](#)
 - hips - spine - chest - (upper chest) - neck - head
 - [head](#) [eye](#)
 - [head](#) [eye](#)
 - [chest](#) [upper chest](#) [shoulder](#) - upper arm - lower arm - hand - (fingers)
 - [chest](#) [upper chest](#) [shoulder](#) - upper arm - lower arm - hand - (fingers)
 - [hips](#) [upper leg](#) - lower leg - foot - (toes)
 - [hips](#) [upper leg](#) - lower leg - foot - (toes)
 - [Humanoid](#) [LowerLeg](#) [empty](#) [empty](#) [UpperLeg](#)
 - [UpperArm](#) [shoulder](#) [chest](#)



- <https://github.com/vrm-c/vrm-specification/issues/87>



- [Mecanim Humanoids](#)
- [Blender](#) [Unity](#) [Humanoid](#) [fbx](#)

BaseModel

GameObject VRM

- Animator
- Animator HumanoidAvatar

FBX

fbx importer rig humanoid fbx prefab humanoid Animator HumanoidAvatar

fbx Humanoid2

-
-

-

[Blender](#) [Unity](#) [Humanoid](#) fbx

FBX

- FBX Prefab GameObject
- FBX Prefab GameObject

- FBX Prefab GameObject
- FBX Prefab GameObject

- HumanoidAvatar `GameObject` `HumanoidAvatar`

HumanoidAvatar `HumanoidAvatar`

- `HumanoidAvatar`
- Human Bone `hips` `GameObject` `HumanoidAvatar`

`HumanoidComponent` `HumanoidComponent`

`GameObject` `HumanoidAvatar`

`fbx importer` `HumanoidAvatar`

[HumanoidComponent](#)

`HumanoidAvatar`

- `GLTF`
- `HumanoidAvatar`

`Hierarchy` `HumanoidAvatar` `HumanoidAvatar` `Prefab` `VRM` `HumanoidAvatar`

HumanoidComponent

HumanoidComponent

UniVRM-0.60.0

fbx humanoid avatar



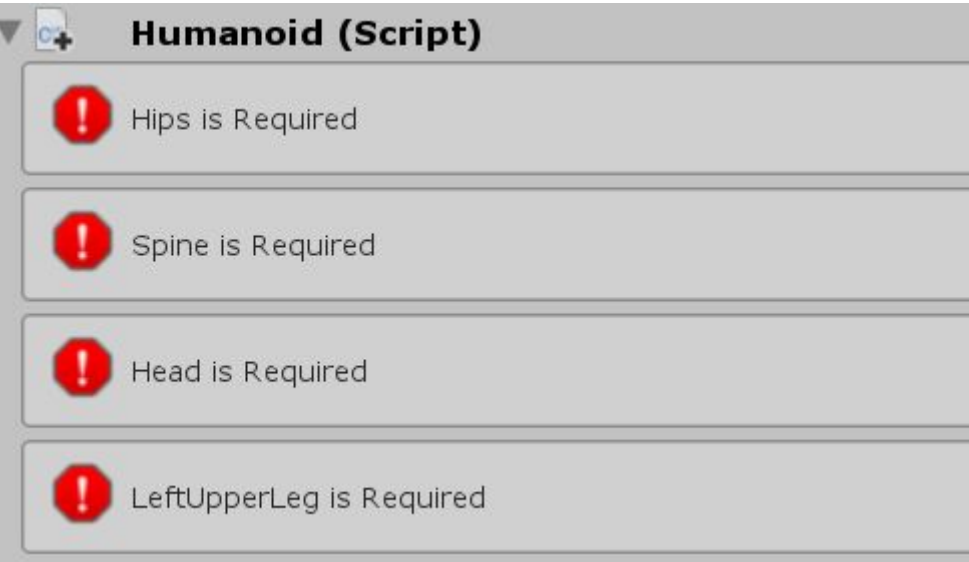
Humanoid Bone

<https://github.com/KhronosGroup/glTF-Sample-Models/tree/master/2.0/RiggedFigure/glTF-Binary>

RiggedFigure.glb Asset glb iVRM prefab()

RiggedFigure prefab

AddComponent Humanoid (MeshUtility.HumanoidUniVRM)

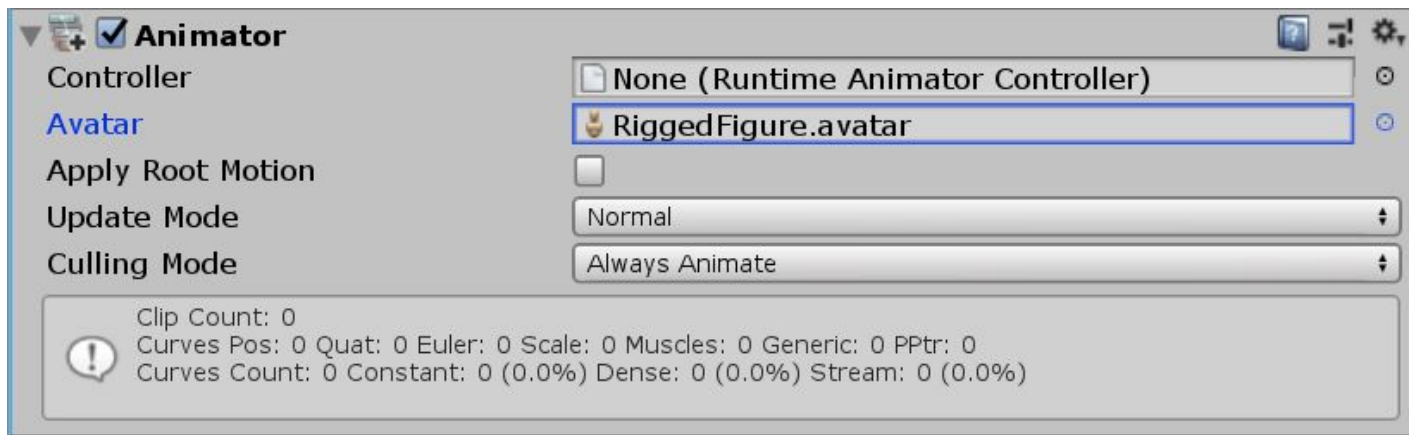


Humanoid (Script)

Hips	torso_joint_1 (Transform)					
Body						
Spine	torso_joint_2 (Transform)					
Chest	torso_joint_3 (Transform)					
Upper Chest	None (Transform)					
Neck	neck_joint_1 (Transform)					
Head	neck_joint_2 (Transform)					
Jaw	None (Transform)					
Eye	None (Transform)		None (Transform)			
Leg						
UpperLeg	leg_joint_L_1 (Transform)		leg_joint_R_1 (Transform)			
LowerLeg	leg_joint_L_2 (Transform)		leg_joint_R_2 (Transform)			
Foot	leg_joint_L_3 (Transform)		leg_joint_R_3 (Transform)			
Toes	None (Transform)		None (Transform)			
Arm						
Shoulder	None (Transform)		None (Transform)			
UpperArm	arm_joint_L_1 (Transform)		arm_joint_R_1 (Transform)			
LowerArm	arm_joint_L_2 (Transform)		arm_joint_R_2 (Transform)			
Hand	arm_joint_L_3 (Transform)		arm_joint_R_3 (Transform)			
Finger						
LeftThumb	None (Transform)		None (Transform)		None (Transform)	
LeftIndex	None (Transform)		None (Transform)		None (Transform)	
LeftMiddle	None (Transform)		None (Transform)		None (Transform)	
LeftRing	None (Transform)		None (Transform)		None (Transform)	
LeftLittle	None (Transform)		None (Transform)		None (Transform)	
RightThumb	None (Transform)		None (Transform)		None (Transform)	
RightIndex	None (Transform)		None (Transform)		None (Transform)	
RightMiddle	None (Transform)		None (Transform)		None (Transform)	
RightRing	None (Transform)		None (Transform)		None (Transform)	
RightLittle	None (Transform)		None (Transform)		None (Transform)	

Create UnityEngine.Avatar

Create UnityEngine.Avatar



humanoid avatar

T-Pose VRM

UniHumanoid

Unity humanoid ☐ BVH ☐

BVH runtime loader

```
var context = new BvhImporterContext();
context.Parse(path);
context.Load(); // create Skeleton hierarchy and mesh for visualize
GameObject root = context.Root;
```

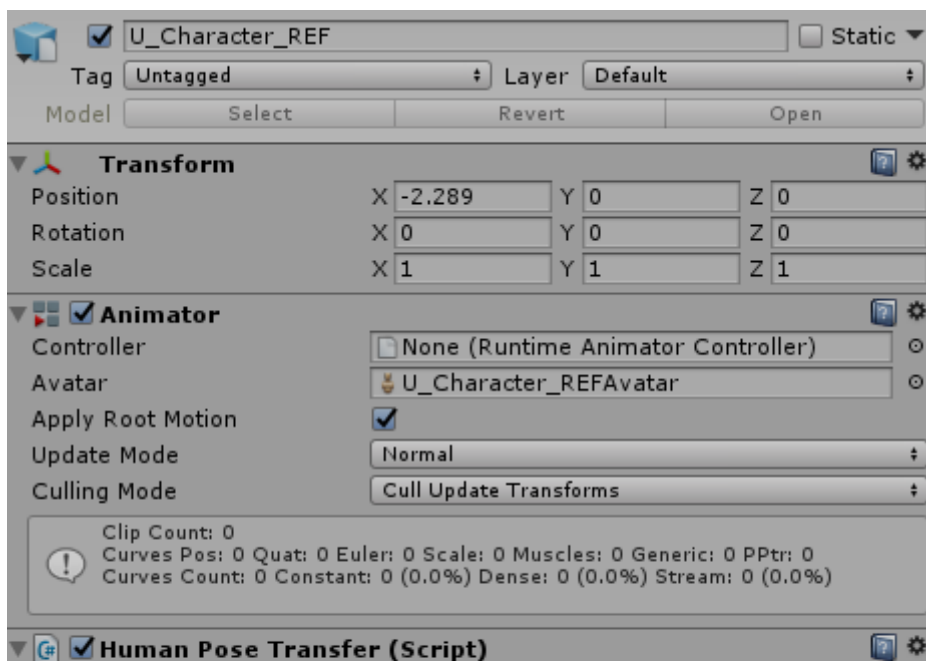
RuntimeLoader

- Scenes/RuntimeBvhLoader.unity

RuntimeLoader ☐ PoseTransfer

☐ BVH ☐

- Scenes/PoseTransfer.unity



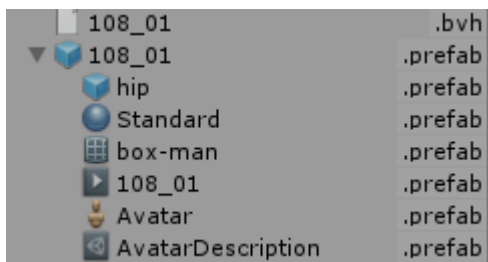


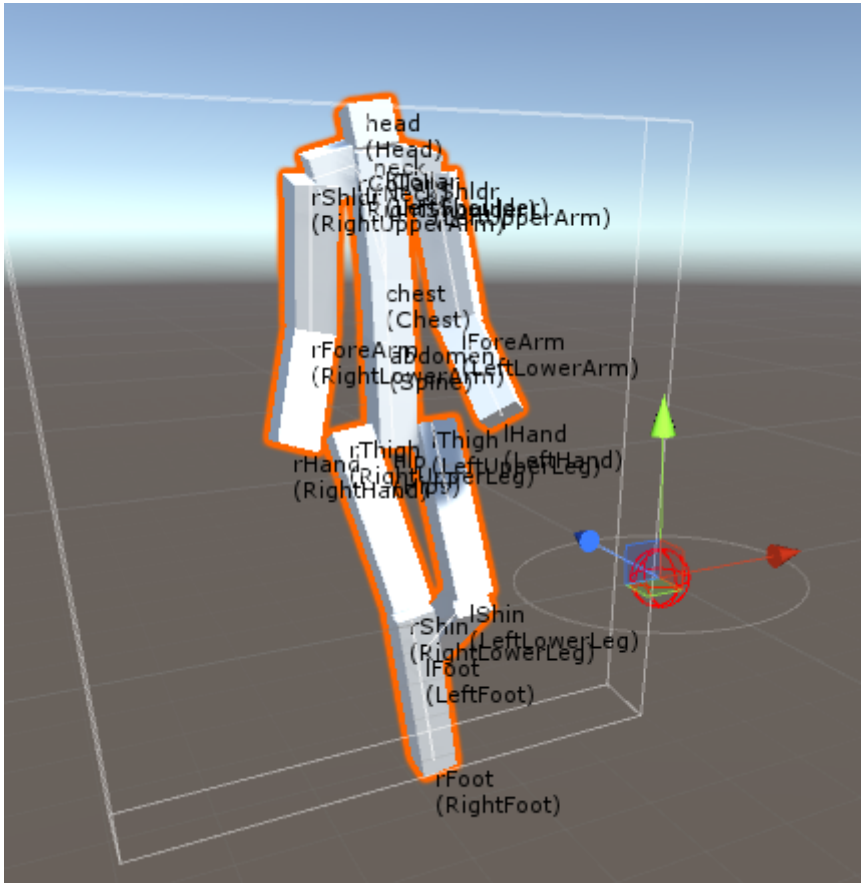
BVHAnimationClip

Drop bvh file to Assets folder. Then, AssetPostprocessor import bvh file.

☐ BVH ☐ ☐ ☐ ☐ Asset Postprocessor ☐ BVH ☐

- `hierarchy()`
- `humanoid Avatar`
- `legacy AnimationClip`
- `preview()`





object .



script(GameObject hierarchy(human avatar Animator(

-
- +Z
- Quaternion.identity
- hips bone

Guess bone mapping()

(), Ensure T-Pose avatar

Bone Mapping (Script)

Hips

Guess bone mapping

! Guess bones from hips

Ensure T-Pose

! Arms to Horizontal

Create avatar

before create,

1. Model root transform should reset(origin without rotation)
2. Model forward to Z+(rotate child of model root)
3. Required bones filled(todo)

Arm	Left		Right
Shoulder	<input type="text" value="lCollar"/>	<input type="radio"/>	<input type="text" value="rCollar"/>
UpperArm	<input type="text" value="lShldr"/>	<input type="radio"/>	<input type="text" value="rShldr"/>
LowerArm	<input type="text" value="lForeArm"/>	<input type="radio"/>	<input type="text" value="rForeArm"/>
Hand	<input type="text" value="lHand"/>	<input type="radio"/>	<input type="text" value="rHand"/>

Body

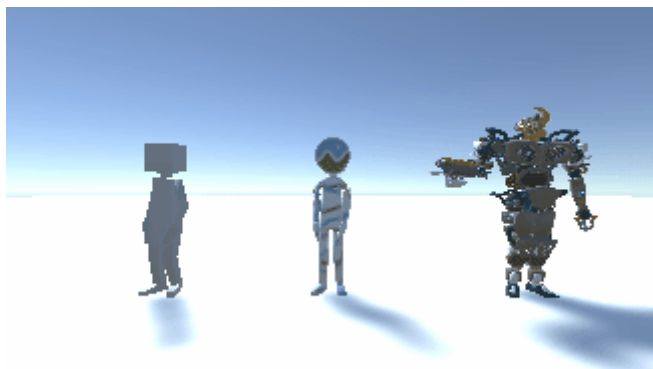
Spine	<input type="text" value="abdomen"/>	<input type="radio"/>
Chest	<input type="text" value="chest"/>	<input type="radio"/>
UpperChest	<input type="text" value="None (Game Object)"/>	<input type="radio"/>
Neck	<input type="text" value="neck"/>	<input type="radio"/>
Head	<input type="text" value="head"/>	<input type="radio"/>
Jaw	<input type="text" value="None (Game Object)"/>	<input type="radio"/>
Eye	<input type="text" value="None (Game Object)"/>	<input type="radio"/>

Leg	Left		Right
UpperLeg	<input type="text" value="lThigh"/>	<input type="radio"/>	<input type="text" value="rThigh"/>
LowerLeg	<input type="text" value="lShin"/>	<input type="radio"/>	<input type="text" value="rShin"/>
Foot	<input type="text" value="lFoot"/>	<input type="radio"/>	<input type="text" value="rFoot"/>
Toes	<input type="text" value="None (Game Object)"/>	<input type="radio"/>	<input type="text" value="None (Game Object)"/>

► Hand

Description

☐ humanoid ☐ UniGLTF ☐ BoneMapping ☐ human avatar



□□ BVH □□

- <https://sites.google.com/a/cgspeed.com/cgspeed/motion-capture>
- <http://mocapdata.com/>
- <http://www.thetrailerspark.com/download/Mocap/Packed/EYES-JAPAN/BVH/>