Azure Kinect body tracking joints

06/26/2019 • 2 minutes to read • 👤👤🌅👤

In this article

[Joints](#joints)

[Joint coordinates](#joint-coordinates)

[Joint hierarchy](#joint-hierarchy)

[Next steps](#next-steps)

Azure Kinect body tracking can track multiple human bodies at the same time. Each body includes an ID for temporal correlation between frames and the kinematic skeleton. The number of bodies detected in each frame can be acquired using `k4abt_frame_get_num_bodies()`.
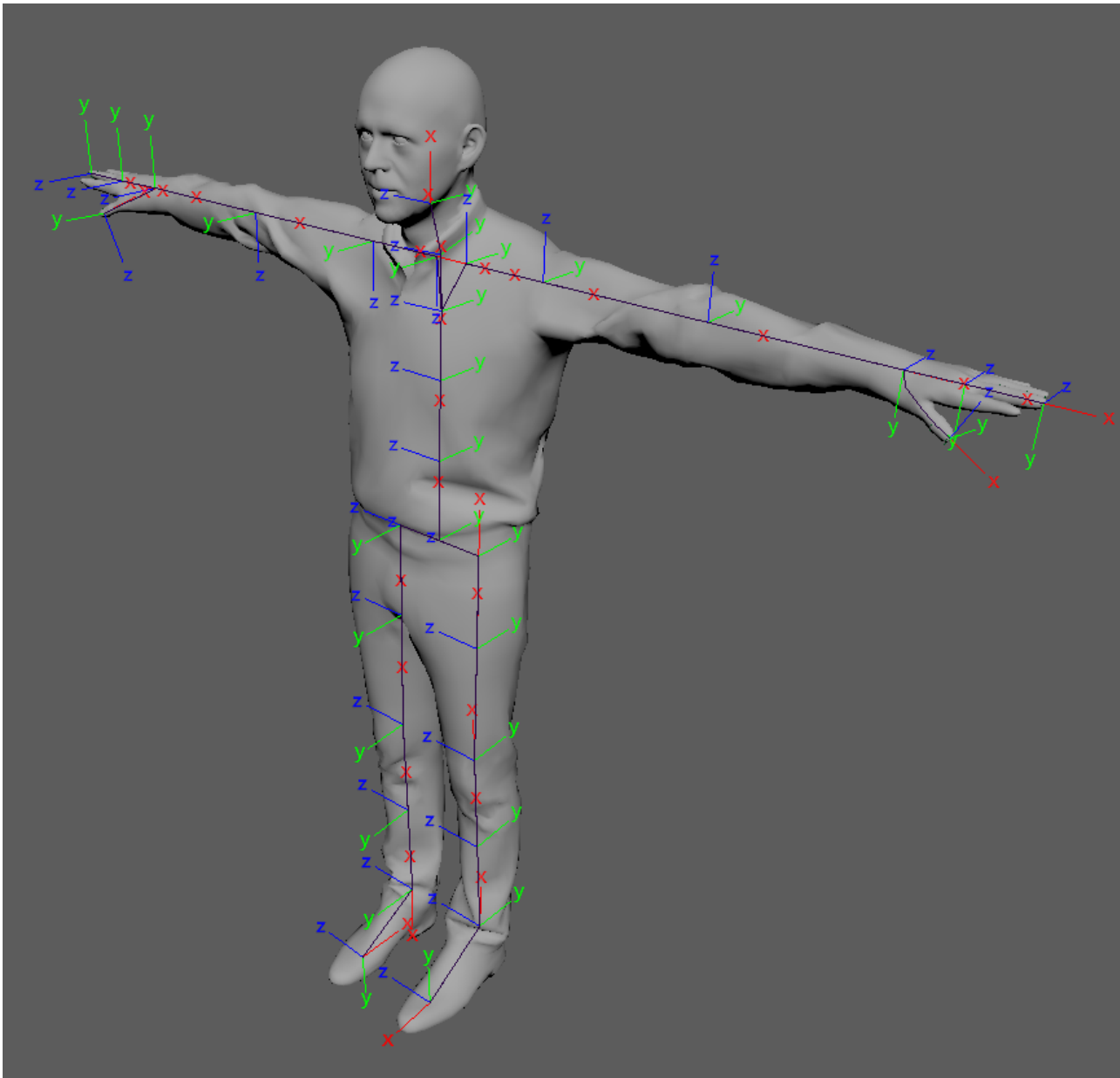
Joints

Joint position and orientation are estimates relative to the global depth sensor frame of reference. The position is specified in millimeters. The orientation is expressed as a normalized quaternion.

Joint coordinates

The position and orientation of each joint form its own joint coordinate system. All joint coordinate systems are absolute coordinate systems relative to the depth camera 3D coordinate system.

> ⓘ **Note**
>
> Joint coordinates are in axis orientation. Axis orientation is widely used with commercial avatars, game engines, and rendering software. Using axis orientation simplifies mirrored movements e.g. raise both arms by 20 degrees.

Joint hierarchy

A skeleton includes 32 joints with the joint hierarchy flowing from the center of the body to the extremities. Each connection (bone) links the parent joint with a child joint. The figure illustrates the joint locations and connection relative to the human body.
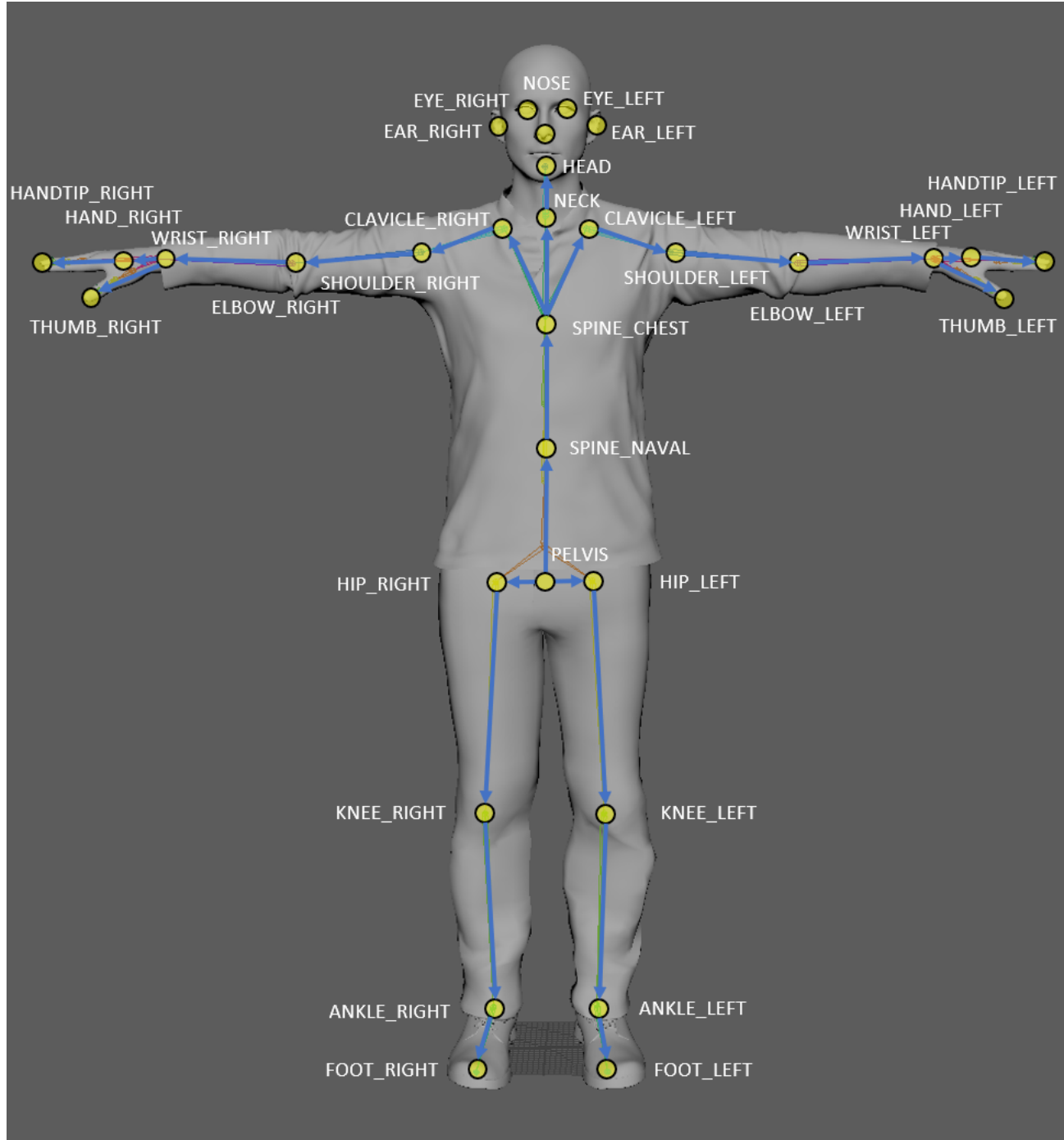
The following table enumerates the standard joint connections.

Index	Joint name	Parent joint
0	PELVIS	-
1	SPINE_NAVAL	PELVIS
2	SPINE_CHEST	SPINE_NAVAL
3	NECK	SPINE_CHEST

Index	Joint name	Parent joint
4	CLAVICLE_LEFT	SPINE_CHEST
5	SHOULDER_LEFT	CLAVICLE_LEFT
6	ELBOW_LEFT	SHOULDER_LEFT
7	WRIST_LEFT	ELBOW_LEFT
8	HAND_LEFT	WRIST_LEFT
9	HANDTIP_LEFT	HAND_LEFT
10	THUMB_LEFT	WRIST_LEFT
11	CLAVICLE_RIGHT	SPINE_CHEST
12	SHOULDER_RIGHT	CLAVICLE_RIGHT
13	ELBOW_RIGHT	SHOULDER_RIGHT
14	WRIST_RIGHT	ELBOW_RIGHT
15	HAND_RIGHT	WRIST_RIGHT
16	HANDTIP_RIGHT	HAND_RIGHT
17	THUMB_RIGHT	WRIST_RIGHT
18	HIP_LEFT	PELVIS
19	KNEE_LEFT	HIP_LEFT
20	ANKLE_LEFT	KNEE_LEFT
21	FOOT_LEFT	ANKLE_LEFT
22	HIP_RIGHT	PELVIS
23	KNEE_RIGHT	HIP_RIGHT

Index	Joint name	Parent joint
24	ANKLE_RIGHT	KNEE_RIGHT
25	FOOT_RIGHT	ANKLE_RIGHT
26	HEAD	NECK
27	NOSE	HEAD
28	EYE_LEFT	HEAD
29	EAR_LEFT	HEAD
30	EYE_RIGHT	HEAD
31	EAR_RIGHT	HEAD

Next steps

[Body tracking index map](#)

Is this page helpful?

👍 Yes 👎 No