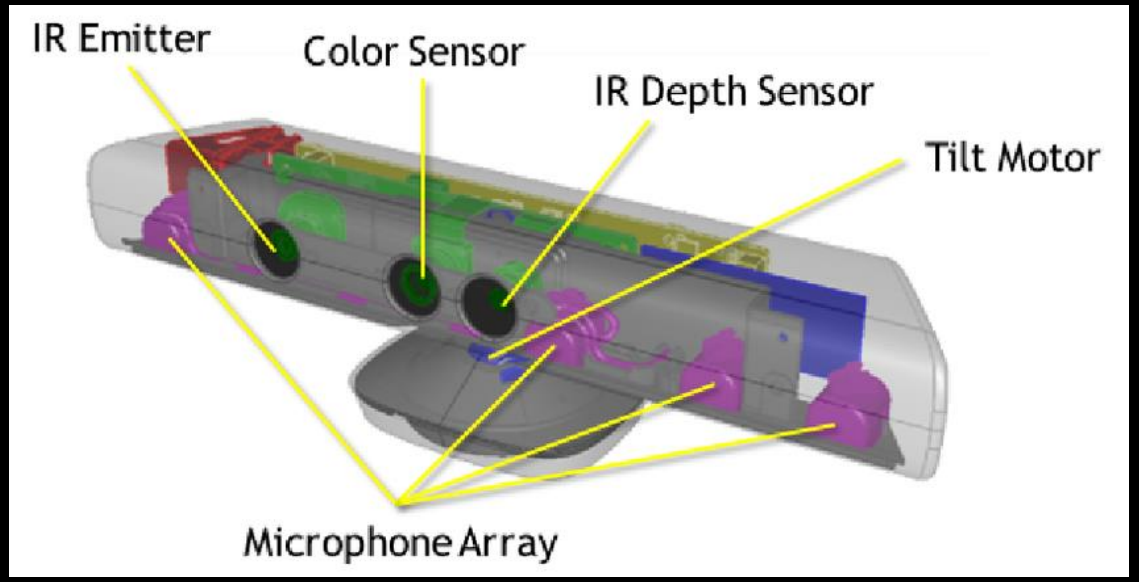
TOUCHDESIGNER
INTERACTIVITY
CLASS II - XBOX KINECT

11-11-2025

XBOX KINECT

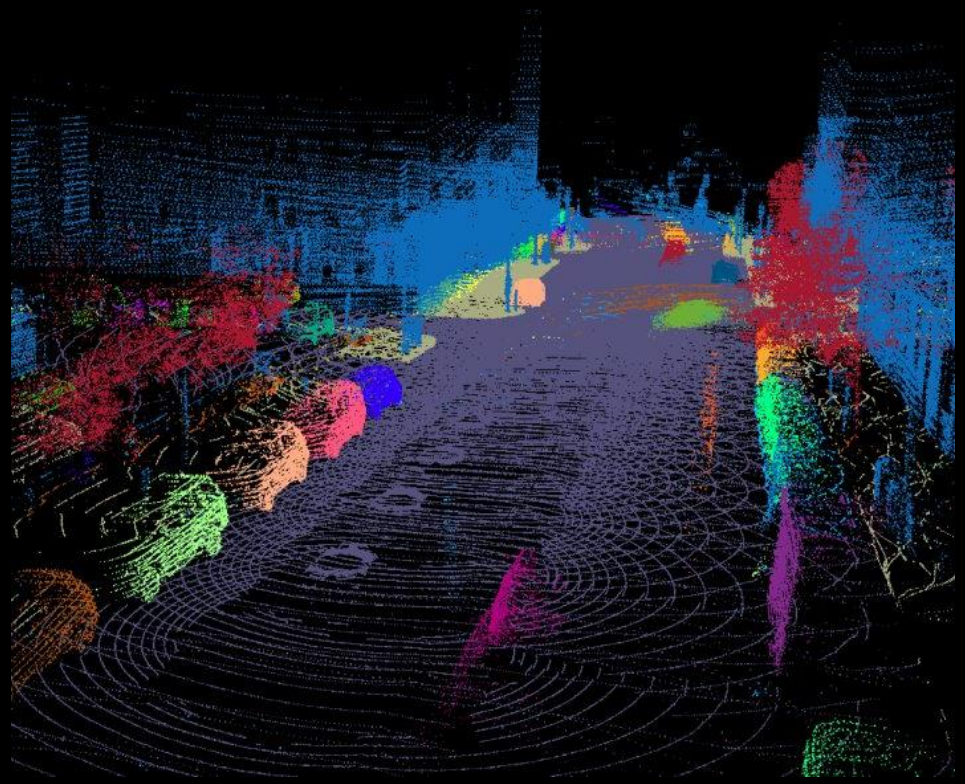
The Kinect is a body tracking sensor originally developed for the Xbox. It was developed so people at home could use their body as a gaming controller.



TIME OF FLIGHT PRINCIPLE

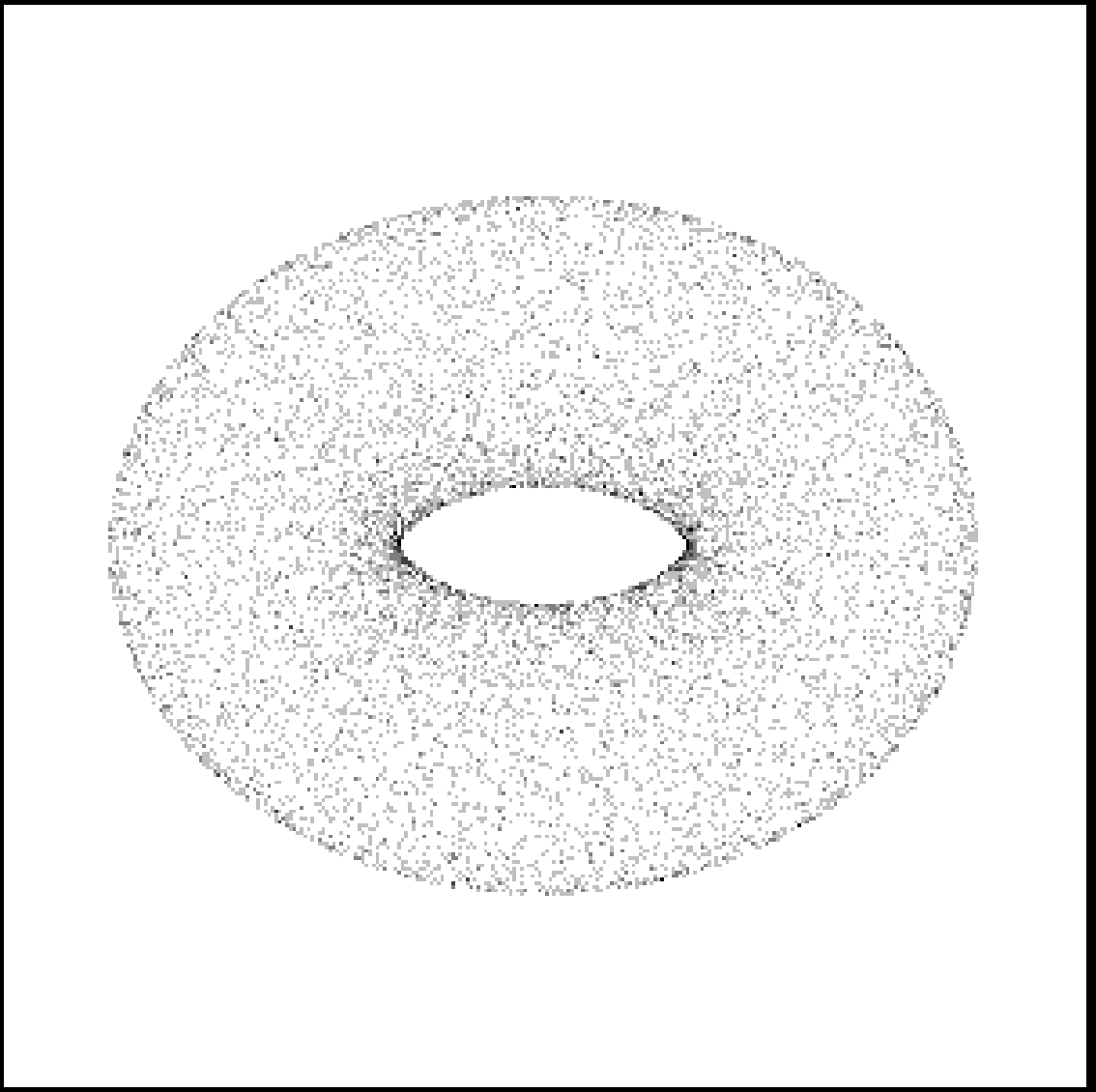
It works on the same principle that we saw last week, time of flight. But instead of sound Kinect uses a grid existing out of thousands of little infrared dots. The Kinect has a infrared sender and a receiver. It calculates the time between sending and receiving for each dot individually and therefor can produce a high resolution 3D point cloud of its environment.

POINTCLOUD

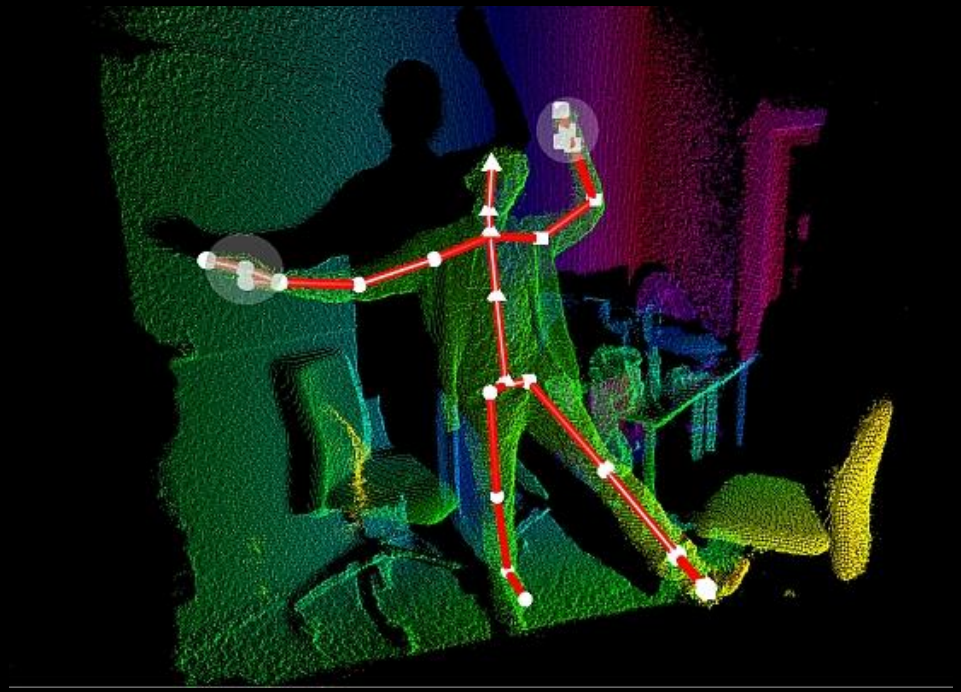


- In the world of 3D geometry and virtual space a common representation of depth information, XYZ-axes, is stored within pointclouds.
- Each point has it's own depth information regarding the XYZ-axes and are distributed over the surface of an object. With clever algorithms we can differentiate between objects within the point cloud, as you can see on the picture.
- In geometry the point clouds can be used for triangulation and to create surfaces extraced from the point cloud information.

POINTCLOUD OF A TORUS



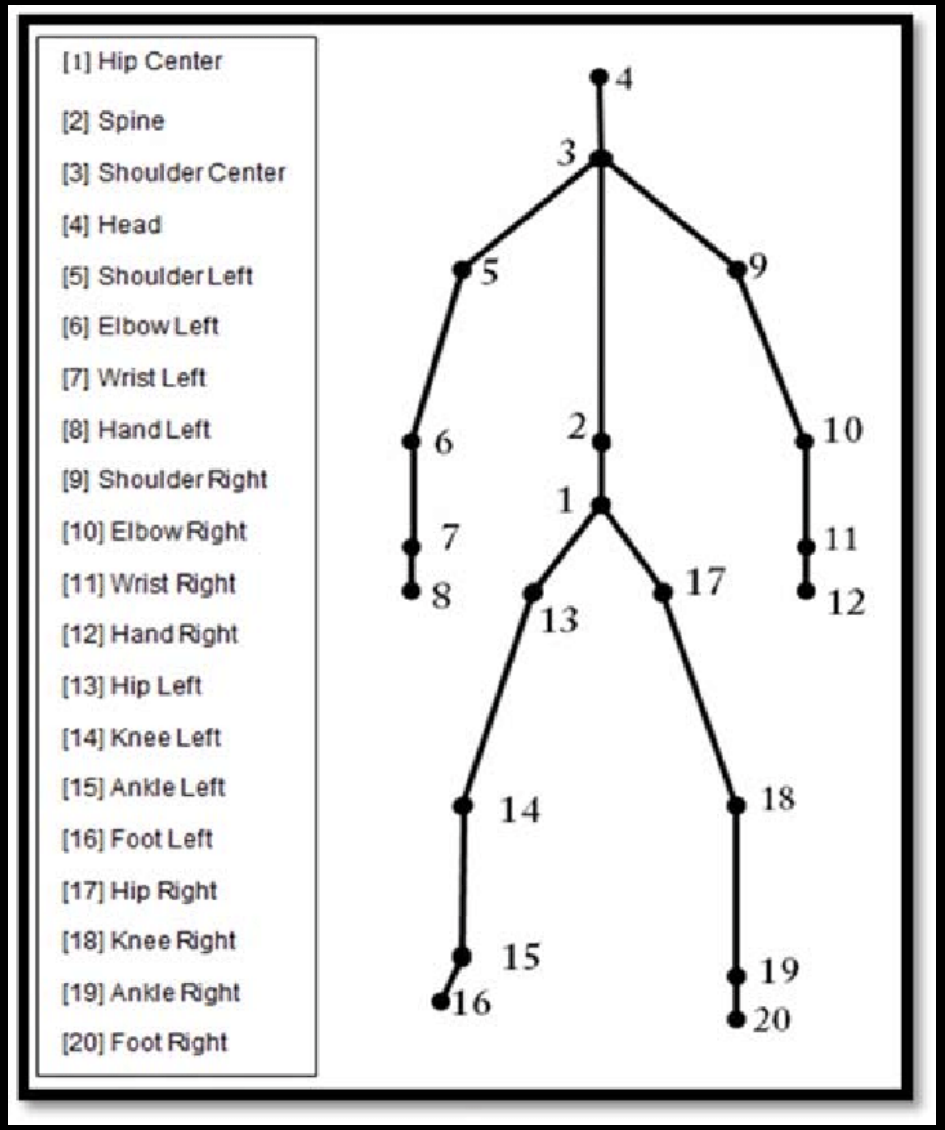
SKELETAL TRACKING



- The Kinect can recognize and extract skeletal information from the pointcloud that is distributed from the sensor into space.
- Thanks to very clever processing and pattern recognition it can detect up to two different bodies within the pointcloud and assign a skeleton to those bodies which are being tracked over the movement of the bodies.

SKELETAL TRACKING POINTS

The Kinect assigns twenty different skeletal points which all can be individually accessed through TouchDesigner and used for further processing within your network.

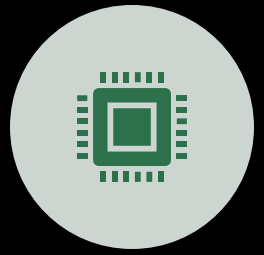


THE GREAT OBSTACLE

- Unfortunately Kinect was developed for Xbox by Microsoft, therefor no official drivers have been released for MacOSX systems.
- There used to be solutions like OpenNI, but with the newer Mx-cpu's the development of OpenNI has halted and it looks like there will never be native support for Kinect on MacOSX.
- How and why should we use it then. Because the Kinect is made in large quantities as a consumer product and actually gives us great resolution in terms of skeletal tracking and depth information and also is quite cheap compared to other systems it is a great tool to get acquainted with. The chances you have to work with it one day in the wild is quite high.

SOLUTION TO THE GREAT OBSTACLE

There are multiple solutions to this obstacle. One would be to run a virtual machine on your Mac system and also run TouchDesigner from this virtual machine. [A virtual machine is a second operating system that runs on your computer, for example Virtual Box or Parallels, so you can run Windows and MacOSX simultaneously.] Currently I am trying to develop a system for this but it will take a long time to finish. You may track the progress at: github.com/studioHEX/Macinect



Another solution, which is going to be viable so we can work across platforms with the Kinect during class would be to have a host Windows system and have it send Kinect data through OSC to client systems. In theory you could use WIFI for this but the connection has to be stable so in our case we use a network switch and create a local network.

WINDOWS USERS

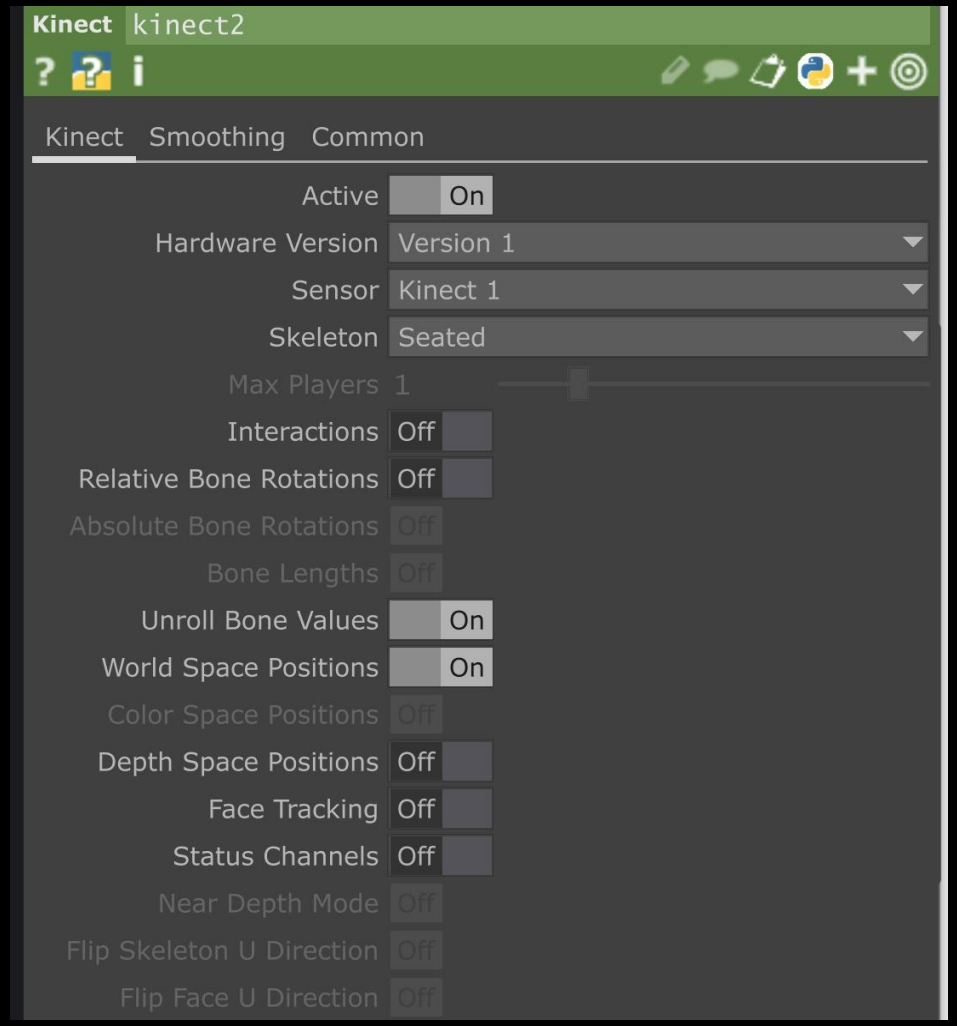
- Windows users are in luck because they have native support for the Kinect due to official drivers released by Microsoft.
- There are two version of the Kinect, v1 and v2, at school we have v1 kinect systems. In order to work with them you have to install a certain set of drivers.
- Kinect for Windows SDK 1.8
- Kinect for Windows runtime 1.8
- You have to install both of them, otherwise the sensor won't work.

KINECT OPERATORS

There are two Kinect operators. One Kinect TOP and a Kinect CHOP.

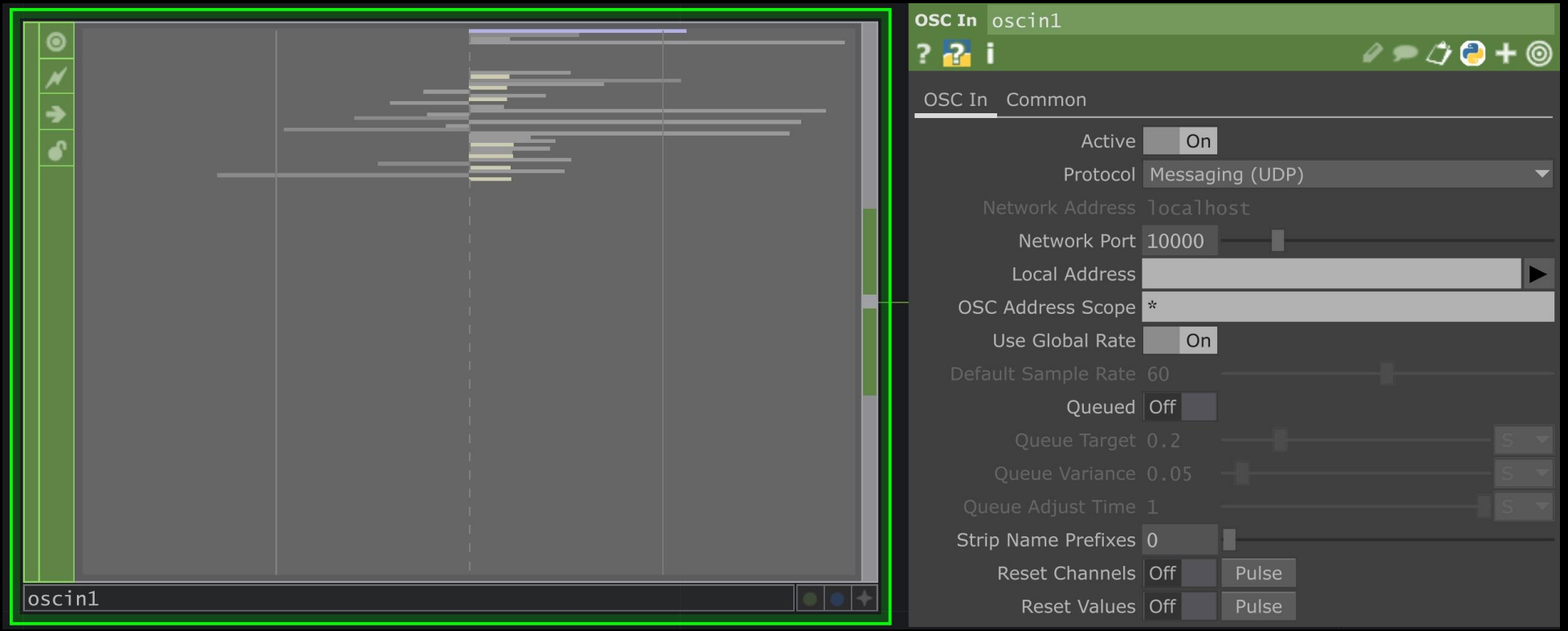
The TOP allows you to process the image feed of the Kinect like the depth image, infrared or as a plain camera.

The Kinect CHOP allows you to process the Kinect skeletal tracking. By default all the bones are collected in one CHOP so you may want to use the CHOP Select operator to extract either one or multiple bones from the Kinect CHOP



- The Kinect CHOP parameter window has a couple of important settings.
- One would be the version of Kinect, so we are using Version 1.
- Second would the skeleton, you can choose between Seated and Full. So choose the appropriate skeleton for your situation.
- Rest of the settings you may leave on default.

ON MAC YOU PLACE A OSC IN CHOP



On windows you may follow the top chain if you have your own Kinect connected.

On Mac you may follow the bottom chain or for Windows if you do not have a Kinect connected.

WE WILL WORK WITH THE KINECT THIS CLASS AND THE NEXT

Due to the many possibilities that Kinect opens up inside TouchDesigner and interactivity we'll take a bit more time to work with it. Although I expect some results at the end of this morning so you can show that you understand how to work with the kinect.