Telepresence Technologies

Thr, August 6 (Week 7.5)
Point Cloud vs. Skeleton
Point Cloud vs. Skeleton

Point Cloud: directly sends all the RGBD pixels

Skeleton: after the mesh is prepared, only sends the position and rotation data of the bones for every frame.

Comparison:

Point cloud is the raw version, while the skeleton would be the one that requires computer vision to figure out the mesh and skeleton information. As a result, it requires less bandwidth and may have better visual quality.
Dynamic Fusion (Newcombe et. al., 2015)

Building a canonical model with the voxel method and warping them for individual frames.

(a) Initial Frame at $t = 0s$	(b) Raw (noisy) depth maps for frames at $t = 1s, 10s, 15s, 20s$

(d) Canonical Model	(e) Canonical model warped into its live frame
https://youtu.be/i1eZekcc_lM
Fusion4D (Dou et al., 2016)

Using multiple cameras but still with voxels. Relies on a function more sophisticated than TSDF.

Figure 2: The Fusion4D pipeline. Please see text in Sec. 3 for details.
Usage of Reconstruction Meshes

Applying 3D reconstruction to the person in the telepresence system.

Advantage: The one with highest visual quality.

Disadvantage: Requires a large amount of computation.
Trade-off with the Number of Cameras

Adding more cameras can provide better visual quality; however, not without any cost.

Advantage: Visual Quality

Cost: Computational Complexity, Difficulty to Install the System
3D Reconstruction without External Cameras

AR headset with many cameras building the environment including yourself.