Sample point cloud file with shape (196133, 3)

A peak into the sample point cloud file:

A white chair in a room

Description automatically generated

**Analyze the 3D Octree Structure using Open3D:**

A drawing of a cube

Description automatically generated with medium confidence A wireframe of a building

Description automatically generated

3D Visualization of Octree with max depth = 3 3D Visualization of Octree with max depth = 5

Problem: Open3D is not useful in projecting 3D visualization to 2D

**Analyze the 2D Octree Structure using Matplotlib, NetworkX, NumPy:**

Basic Visualization:

A diagram of a tree

Description automatically generatedA blue and black network

Description automatically generated

2D Octree Visualization with max depth = 3 2D Octree Visualization with max depth = 5

Better Visualization? Correlating node size and color with tree depth

\*The name of the Matplotlib colormap is *coolwarm*

A network of colored circles and lines

Description automatically generated

2D Octree Visualization with max depth = 3, color in scale of depth

Time spent to run our program when doing the better visualization:

\*Time Spent = Time to Load Point Cloud File + Time to Construct Octree + Time to Visualize Octree

|  |  |
| --- | --- |
| Depth | Time Spent(s) |
| 3 | ~1.41 |
| 4 | ~1.97 |
| 5 | ~4.84 |