EECE5698: Networked XR Systems
Homework3 – Due 03/01/24

The objective of this homework is to apply 3D compression on mesh and point cloud models.

Instructions:

Part I: Google Draco Compression

1. Getting Started with Draco (10 points)
   Read the Draco documentation to understand its purpose, how it works, and its applications. Compile, install and set up Draco in your development environment. Include any challenges you faced and how you resolved them. Attach a screenshot of running any Draco executable on your computer.

2. Command Line Options (15 points)
   Use command line options for encoding and decoding of a mesh and point cloud model. Use 5 different levels of encoding, and plot encoding level vs. compressed size for both mesh and point cloud model.

3. Using APIs (20 points)
   Use encoding and decoding APIs to encode and decode a mesh and point cloud model. Use the same 4 levels that you used above, and verify the compressed sizes if they are same or not by comparing with the above plots. Ideally, you should see same compresses sizes for same level using both API and command line option.

4. Report latency numbers for each level for both mesh and point cloud, for encoding and decoding (10 points)

Part II: MPEG GPCC Compression

5. Getting Started with GPCC (10 points)
   Read the GPCC documentation to understand its purpose, how it works, and its applications. Compile, install and set up GPCC in your development environment. Include any challenges you faced and how you resolved them. Attach a screenshot of running any GPCC executable on your computer.

6. Command Line Options (25 points)
   Use command line options for encoding and decoding of a point cloud model (preferably the same model that you used above). Report the compressed size.

7. Report latency numbers for each level for point cloud, for encoding and decoding (10 points)

Submission Guidelines:

- Prepare a detailed report documenting each step of the process, including code snippets, parameter values used, and results obtained.
- Include visualizations such as rendered images and graphs to illustrate your findings.
- Submit the report along with the source code and any additional resources used.
- Ensure the code is well-commented for clarity and understanding.