Neural Network-Driven Optimization of Point Cloud Quality Assessment Using 2D-Mapping

# Problem Formulation

This project focuses on the need for specific and local quality assessment of point clouds. Current methods are primarily based on point density which can be misleading for complex geometries. If ones wish is to improve point cloud quality, knowledge of quality at specific points is needed to decide if a rescan of said points is necessary.

To improve accuracy and allow evaluation of specific points, a method using 2D-mapping of the surface has been developed by (Leihui Li and Xuping Zhang)[[1]](#footnote-1). This project aims to improve this methodology, both in terms of accuracy and speed, by utilizing neural networks for 2D-mapping and/or evaluation.

In this project the following questions should be investigated:

1. Which features are essential in determining the quality of the 2D-map of a point cloud?
2. Is a neural network the right tool for this assessment, and if so, what kind of network and architecture is most effective?
3. Is it possible to reduce the time of the 2D-mapping enough to make this methodology a viable option to asses where rescans are needed in real scenarios?

1. <https://www.sciencedirect.com/science/article/pii/S0736584524001509?via%3Dihub> [↑](#footnote-ref-1)