Software stack

Software Innovation Center
DATA LAB
VOLKSWAGEN GROUP

Development
- Python
- conda and virtual environments
- preferably docker with ubuntu

Neural nets
- preferably PyTorch
- Tensorflow

Libraries for 3D data
- Kaolin https://kaolin.readthedocs.io/en/latest/
- PyTorch3D https://pytorch3d.org/
- PyTorch Geometric https://pytorch-geometric.readthedocs.io/
- PyMesh https://pymesh.readthedocs.io/

Visualisation
- In python https://plotly.com/
- MeshLab https://www.meshlab.net/
- Blender https://www.blender.org/

First technical steps

Software Innovation Center
DATA LAB
VOLKSWAGEN GROUP

Set-up

- Configure environment, install libraries and dependencies (preferably HPC and locally)

Read and standardize models

- Class for reading mesh data
- Method for standardization (model scaling)
- Method for sanity checks (i.e. broken faces, vertices, normal, waterproof the 3D model)
- Orientation of the model (longest axis along “Z”)

3D model manipulation

- Method for voxelization with adjustable resolution
- Method for making cylinder-like holes with certain diameter and location and orientation of the long axis
- Method for making cylinder-like holes with random diameter and location and orientation of the long axis

Example models

- Vertical hole
- Sandford bunny