PML&DL. Weekly Report

Student Information

Student: Anna Boronina

Group: BS18-DS-01

Telegram: @whoorma

The Project: Generation of 3D objects using GANs.

Progress

There is a paper explaining the implementation of DeepVoxels architecture [1]. Basically, as I understood, they create latent space representation for a model and then generate new unseen 3D objects using this set of features. The generator doesn't have an access to the original model, while the discriminator does. They do it on voxels, but my goal is to word with pointclouds. It doesn't matter because a pointcloud can be easily converted to voxel-representation.

There is a similar feature extraction approach for pointclouds directly [2] which is closer to what I want. Yet, it's also convolution-based. Even though seems like convolution-based methods are slow, they are still widely used.

Another cool thing is Graph CNN [3] for learning pointcloud features. It's, again, a CNN-based approach. I skimmed through and it seemed interesting.

Future plans

- read about graph networks because most probably, I will use this approach.
- understand how to construct view-independent feature extractor (meaning that it will not matter from which point the object is viewed. One way to do so that I've seen is to use RNN to slice the object and go through each slice)
- find how to visualize point clouds (I planned to work in Colab because it's the only thing with GPU I have, but I'm afraid there isn't any framework to view pointcloud there. Most probably I will have to export files and view them somewhere else)

References

[1] Sitzmann, V. (2018, December 3). *DeepVoxels: Learning Persistent 3D Feature Embeddings*. https://arxiv.org/abs/1812.01024

[2] Wenxuan Wu, Zhongang Qi, Li Fuxin (2019). *PointConv: Deep Convolutional Networks on 3D Point Clouds* (CVPR), pp. 9621-9630. https://openaccess.thecvf.com/content_CVPR_2019/html/Wu_PointConv_Deep_Convolutional_Networks_on_3D_Point_Clouds_CVPR_2019_paper.html

[3] Yue Wang, Yongbin Sun, Ziwei Liu, Sanjay E. Sarma, Michael M. Bronstein, and Justin M. Solomon (2019). *Dynamic Graph CNN for Learning on Point Clouds. ACM Trans. Graph.* 38, 5, Article 146 (November 2019), 12 pages. https://dl.acm.org/doi/abs/10.1145/3326362