6635 final project proposal

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1 Project description

Team Names: GANNNNNNN

Project title: Using SP and Point Encoder GAN to manipulate point cloud

Give an overview of the project.
We found these two papers related to our projects. SP-GAN: Sphere-Guided 3D Shape Generation and Manipulation and Point Encoder GAN: A deep learning model for 3D point cloud inpainting. These two papers used a Generative adversarial network to achieve their goal. The first paper used GAN to generate model shapes, and it could interpolate and separate object parts. The second paper used GAN to repair defective point clouds. We think we could combine these two papers and do something interesting.

Why is this project important and/or interesting?
Deep learning has been a hot topic in recent years. In the class, we learned about using GAN to do volume rendering. But their repo was well-developed, so there is not so much work we could do. So we shifted our interest to other visualization problems using similar tools.

What are the objectives of the project? What are the questions you want to answer?
The data structure of the point cloud is widespread in engineering. At the same time, GAN has been a hot topic in computer graphics and visualization in recent years. We intend to study the effect of this point cloud dataset with the GAN. We want to try to solve the problem of disassembling the model with GAN, rebuilding it according to some model parts, and evaluating the visualization quality of the new model.

What would you like to learn by completing this project?
How to use Python to build a GAN.
How to visualize point cloud data.
How to disassemble and reconstruct the existing model.

What data will you be using for your project?
ModelNet40.
This dataset contains 40 categories. We will plan to use OFF format data for training and experiment.

If you are doing a programming project, list the hardware and software you will be using.
Hardware: CPU and GPU
Software: PyCharm, TensorFlow, PyTorch.

What is your project schedule? What have you done thus far and what will you have to do to complete this project? Be as specific as possible.

Mar 20th	Read through the papers and find any possible related dataset, papers, or other material
Mar 27th	Build up the orginal network using GAN (SP GAN and Point Encoder GAN) based on some sample datase
Apr 3rd	Train sample network or use existing network
Apr 10th	Anlyze the network performance and create our own network for our term project
Apr 17th	Write final report and video demo
Apr 24th	Wrap it up

When the project is completed, how specifically can we evaluate how successful it is?
Pass in any pre-trained model shape and see the visualize demonstration.