

Project topics form

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* Required

Proposal

Please describe in a few sentences the task you propose to address *

Answer like you would in the first paragraph of a paper, by putting the task into a context and explain your motivations. Optional : if that idea comes from a source (online challenge, proposed by a CMU faculty, etc) you can tell us here.

Introducing an energy-based generative model to progressive growing of GAN to make model more robust and generate high-quality images.

Please refer some papers (at least 2-3) addressing a similar task *

For each paper, briefly describe its approach (1 sentence), and if possible some limitations of that approach justifying why you would try something else.

<https://arxiv.org/abs/1901.08508>, proposed MEG, an energy-based generative model that produces energy estimates using an energy model and a generator that produces fast approximate samples.

<https://arxiv.org/abs/1710.10196>, described a new training methodology for generative adversarial network, in which the key idea is to grow both the generator and discriminator progressively.

What data do you intend to use ? *

Provide a link if it exists, a brief description, the length and size of the dataset(s), the metrics you'd use

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CELEBRA <http://mmlab.ie.cuhk.edu.hk/projects/CelebA.html>

CELEBA, <http://mmlab.ie.cuhk.edu.hk/projects/CELEBA.html>

would try CELEBA-HQ Dataset and LSUN, BEDROOM category, if possible.

Please describe your proposed approach for the project *

Describe a baseline (can be one of the reference papers), experiments you want to run on it, some original ideas you want to try out for the final project.

Baselines: PG-GAN using sliced Wasserstein distance (SWD) and WGAN-GP, in which images are generated from a low resolution, then new layers are added that model increasingly fine details as training progresses.

Ideas: We want to improve this model with an energy-based generative model, which should improve the robustness of the training progress, and as a result make the model more steady and generate high quality results.

Did you think about the feasibility of your task ? *

Example : tell us the kind of model sizes literature uses on the same task, their computation time if they report it, if you know some reference hyperparameters to help you, if the dataset size seems manageable, if you have access to personal computational resources, or more generally your reasons to believe that you can conduct this project within the course constraints. If you think the project is feasible but aren't sure and would want input on this, tell us as well.

training time: for generating 128*128 images with high quality on a single gpu, 24-36 hrs is enough as provided in the paper, and they provided hyper parameters as well. If possible, we can try generating 512*512 images which may take longer to train but limited to 60 hrs to converge. And the dataset seems to be manageable, which is no larger than 200k images for each dataset(including 32*32 or larger versions). And we've got Google Cloud Platform with a free \$400 for each teammate. So we think our task is feasible.

Optional : let us know about any other relevant information regarding your project

Your answer



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