A Study in GANs

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PROJECT OVERVIEW

The project runs along 2 tracks

1. Standard for most people - implement pre existing models using torchGAN, do literature review. End with models like discogan and stargan

2. NLPGAN - (difficult) Design a framework to handle gans with recurrent nets. Ideally people with some software dev experience and ml background should take this. Aim is to design something similar to torchgan but explicitly for nlp.

The aim is to strike a balance between teaching theory and practice, with the goal that upon completion, mentees are able to read, understand and easily implement a significant fraction of the current literature on GANs

ROADMAP

- Deep Learning Primer with an emphasis on Generative Models
- Introductory lecture on GANs with a Primer on PyTorch
- Writing your first GAN model using TorchGAN
- GAN Losses: Theoretical Insight and Experimentation
- Metrics of GAN performance and practical advice on evaluating and training GAN models. As an exercise at this checkpoint, mentees shall be expected to present a quantitative comparison of various GAN losses
- Semi Supervised Learning and Class Conditional Models with a quantitative comparison of various class conditional models
- Domain Application: Neural Style Transfer and CycleGAN
- Domain Application: Image Super Resolution and SRGAN

CURRENT PROGRESS

Week 1-2 :Going through the video lectures of CS231 , understanding Deep Convolutional Neural Networks and implementing them on basic MNIST and CIFAR-10 dataset . Implementing Resnet,VGG and DenseNet on CIFAR-10 dataset

Week 3 : Going through research papers of GAN , DCGAN and ACGAN . Understanding the basic functionality of a GAN and implementing them using Pytorch . Get familiar with Torchgan by reading its documentation and tutorials and then implementing DCGAN , ACGAN and CYCLEGAN using torchgan Trainer .

Week 4: Writing custom datasets for datasets like CelebA and CityScapes which are not in torchvision and implemating yaml config files similar to Facebook's Maskrcnn benchmark for Torchgan to make it a much better research framework for training GANs .

FUTURE PROSPECTS

- Making a yaml parser for torchgan which would take yaml files having all necessary parameters and return the dictionary of parameters or a object of the model itself which makes implementing a GAN model much easier which is being used by Facebook in Caffe/ Detectron/ MMDetection/ MaskRCNN-Benchmark .
- Study research papers of NLP GANs and try implementing them and observing the common abstractions in them . now if we could generalize our abstractions to uncommon papers then NLPGans models could also be added in torchgan.models which currently has GAN models only for vision .