Generative Adversarial Nets

Summary

Ian Goodfellow in his paper talks about the General Adversarial Networks or as commonly knows as GANs. He talks about how it is a framework which is used to train generative models. The basic idea he puts forward is that of having 2 models i.e., D and G. D is discriminative model used to evaluate likelihood of sample data whereas G is generative model which captures data distribution. Both G and D are trained simultaneously.

In the paper the authors have done a brilliant work of theorizing the General Adversarial Networks. Ian and other also showcase how true data distribution can be recovered by G. The need for Markov chains has been showed to be removed by using backpropagation.

Various experiments on datasets using GANs has been listed out in this paper. The datasets that were used are CIFAR-10, MNIST, and TED. With the help of these experiment sit has clearly shown how it is better than other generative models. Authors of the paper have also done a brilliant work of giving us the various disadvantages and advantages. Like representation of the probability distribution being difficult and its capability of personifying sharp distribution to be named as few.

In conclusion, Ian and the other authors has suggested frameworks like SSL and conditional models. The major highlight has been on future research on General Adversarial Networks which can lead to better initial results and increasing the adaptability of frameworks.

Comparative Analysis

Advantages

1. The necessity of Markov chains for sampling is removed.
2. The General Adversarial Networks have the capability of creating sharper samples.
3. More flexible learning process is achieved as D is the one giving gradients to G.
4. The flexibility of GANs allow a plethora of functions to be included in it.
5. Training process is being made more scalable as it requires only backpropagation to get gradients.

Disadvantages

1. There is no direct showcasing of the probability distribution $p_g(x)$ by the GANs. Making analyzing difficult.
2. Careful synchronization of G and D must be done or else the model can collapse giving bad results.
3. Unlike other generative models GANs are difficult to train.
4. With the help of the use of Parzen window estimation in the paper we were also able to see how performance evaluation is not easy in General Adversarial Networks.
5. The paper is highly theoretical but practically the performance of these General Adversarial Networks is very architecture dependent and also on the training methods used. Which in turn make prediction of how a change can affect the model.