DAY 20

29 JUNE 2024

Topic:

GAN'S(Generative Adversarial Nets)

Components of a Generative Adversarial Network :

There are two major components within GANs: the **Generator** and the **Discriminator**

Generator:The Generator attempts to fool the Discriminator, which is tasked with accurately distinguishing between produced and genuine data, by producing random noise samples.

Discriminator:The discriminator in a GAN is simply a classifier. It tries to distinguish real data from the data created by the generator. It could use any network architecture appropriate to the type of data it's classifying.

We will use matplotlib for plotting, tensorflow as the Keras backend library and tqdm to show a fancy progress bar for each epoch (iteration).

The next step is to create a Python script. In this script, we first need to import all the modules and functions we will use. An explanation of each will be given as they are used.

```
import os
import numpy as np
import matplotlib.pyplot as plt
from tqdm import tqdm


from keras.layers import Input
from keras.models import Model, Sequential
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Dropout
from tensorflow.keras.layers import Dense, Activation
from tensorflow.keras.layers import Activation
from tensorflow.keras.layers import LeakyReLU, PReLU, ELU

from keras.datasets import mnist
from keras.optimizers import Adam
from keras import initializers
```

Code Explaination:-

This code imports necessary libraries and modules for building a deep learning model using Keras.

• os module provides a way of interacting with the operating system.

• numpy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

• matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy.

• tqdm is a progress bar library with good support for nested loops and Jupyter/IPython notebooks.

• keras is a high-level neural networks API, written in Python and capable of running on top of TensorFlow, CNTK, or Theano.

• The code then imports specific modules from Keras, including Input, Model, Sequential, Dense, Dropout, LeakyReLU, mnist, Adam, and initializers.

• These modules are used to build and train a deep learning model for image classification on the MNIST dataset.