Character Recognition using CNN

Before you begin

- Please download letters.zip and character_recognition.ipynb
- In your Google Drive create a folder **CNN**
- Inside the folder upload the downloaded letters.zip and character_recognition.ipynb
- Right click on character_recognition.ipynb and then click on open with Google colaboratary
- Now you are ready to run the code

Dataset

- **Downloading the MNIST Data**
  - The EMNIST dataset is a set of handwritten character digits derived from the NIST Special Database 19 and converted to a 28x28 pixel image format and dataset structure that directly matches the MNIST dataset.
  - EMNIST Letters: 145,600 characters. 26 balanced classes.
  - Link-https://www.nist.gov/itl/products-and-services/emnist-dataset

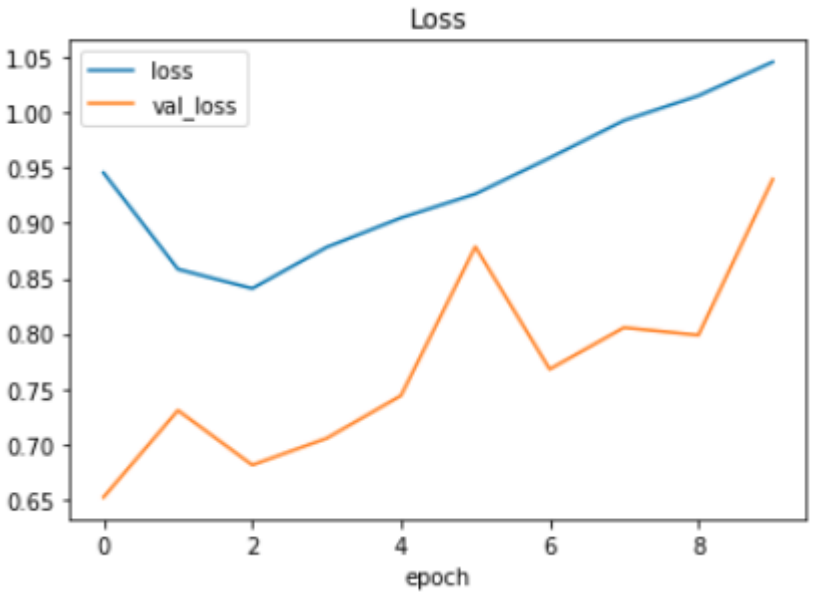
Proposed Model

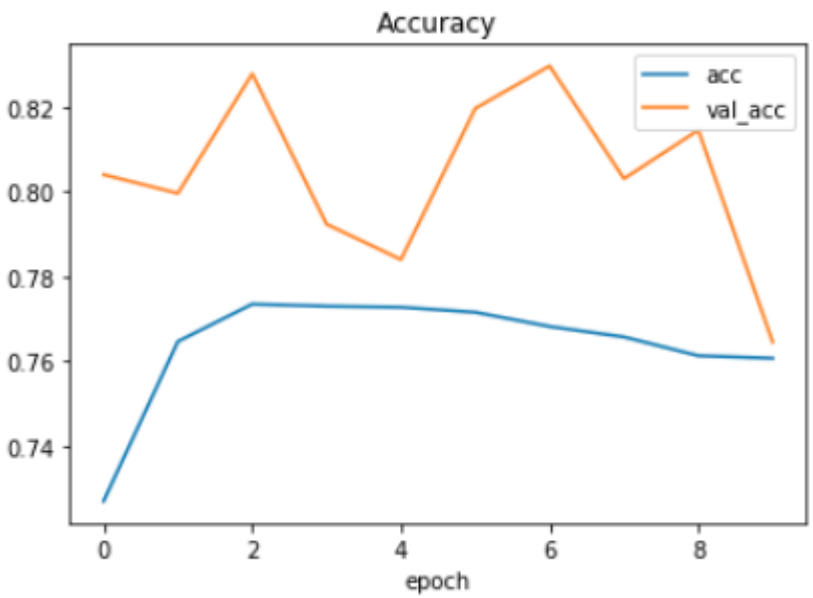
- We will build our model by using high level Keras API which uses TensorFlow as backend.
- We are creating Sequential Model from Keras and will add Conv2D, MaxPooling, Flatten, Dropout, and Dense layers.
- Dropout layers fight with the overfitting by disregarding some of the neurons while training.
- Flatten layers flatten, 2D arrays into a single dimensional array before building the fully connected layers.

Counts and Figures

- There is single convolutional layer and two fully connected layers.
- For the sake of example and ease of implementation and understanding we have take only one conv_2d layer which can be added more for achieving good accuracy.
- One dropout layer for regularization is used with 0.2 probability of dropping.
- Adam optimizer is used with learning rate 0.01.
- Relu activation is used in the early dense layer and Softmax at the final output layer.

Results





- Validation Accuracy and Validation Loss

  [0.9290183062561286, 0.7679807692307692]