**Day 39**

**What to do?**

Now it is time to tune the hyperparameters in the project and see how the model performance is changing.

**Dataset:**

MNIST Handwritten Digit Recognition System from Analytics Vidhya (https://datahack.analyticsvidhya.com/contest/practice-problem-identify-the-digits/#About)

**Process:**

The data has been preprocessed by scaling the values. Two models have been built to see how the accuracy changes.

Using KerasTuner, a model was built for hypertuning. Initially, the images are flattened, then hidden layers’ units are passed as hyperparameter that chooses units between 64 and 1024 neurons. Two hidden layers are added to the model using relu activation. Finally, output layer is added using softmax activation and 10 neurons (0-9 digits).

Learning rate parameter is also added as hyperparameter for Adam optimizer, that chooses optimal value among 0.01, 0.001, 0.0001. The model is compiled with Adam optimizer and sparse categorical cross entropy loss function. The models are trained with 10 epochs, batch size of 500 and validation split of 20%.

**Results:**

Training Accuracy: 98.51%

Testing Accuracy: 97.45%

**Recommendations:**

Model can be performed much better in terms of bias as some models achieved 99% - 100% accuracy.