Assignment 4

Matthieu Fisher & Steve Wen

Steve took care of fitting the model and importing / pre-processing the data. I focused on the write up and writing code to test different hyperparameters on the training & validation data.

We used a Convolutional Neural Network to try to predict the correct label for each image. Our training model has 50000 images which are of dimension 28*28. Our test data contains 2000 observations. We pre-processed the data by rescaling all the inputs (divide them by 255) before feeding them into the model.

We wrote a chunk of code (optional to run) where we divide the training data between training and validation for hyper parameter selection. 45000 images were selected for training, and the final 10 % were left for validation. The hyperparameters we considered here were the dropout rate, the number of units in our hidden dense layer, the number of epochs, and the number of filters in our convolutional layers (we have 2 different 2D convolutional years). We fit the model for every possible combination of those hyper parameters and save the accuracy of each model on the validation data. The procedure is to select the model with the set of hyper parameters that yields the highest validation accuracy.

We used Max Pooling (MaxPooling2D((2,2))) to reduce the dimension of the data, and flattened (Flatten()) the images to pass the data into the dense layer.

We fit our model with the following analytical characteristics:

{epochs = 10, filters = [32,64], dropout = 0.2, dense layer = 128}

Results: Accuracy around 85 % (see Kaggle competition results)

You can access our code through this link:

https://colab.research.google.com/drive/1wF-WCOaFHRbMytB4RuDkC71zvy4rx-R7?usp=sharing