MAIS202: Assignment 4

i. Implementation of the model

We decided to implement a convolutional neural network model since we know that those are good models to use when analyzing images and classifying them based on their features. The reason is that convolutional neural networks are able to extract the different features of an image automatically. We only have to specify the hyperparameters and adjust them to our inputs. Moreover, several different frameworks provide us with tools to use this model and there are many resources available to guide us in the implementation.

ii. Results

The best result we've obtained while trying out different hyperparameters is a 0.87 accuracy score on Kaggle with 2 convolutional layers and 2 dense layers. In the first convolutional layer we have 32 filters and in the second one we have 68 filters. The kernel size we used for a convolution and pooling is 2x2. In our dense layers, the first filter has 128 layers.
As one of the important steps in solving the problem, we changed the values of the epoch to check for better accuracy. Using 5 training sessions was the optimal value we found.
Overall, the training of our model with these parameters took us a total of 5 minutes, which is a fair training time considering the data size and the CNN model that we chose.

iii. Challenges

It was very difficult to correctly implement the model because neural networks are new to us. We were also unfamiliar with the Tensorflow library so we had to invest some time learning about it. However, once we understood what to do, the coding part was revealed to be relatively short.

iv. Conclusion

The outcomes of this assignment are as following:

1. Learning in depth the Convolutional Neural Network model.
2. Learning tensorflow and Keras libraries to implement CNN.
3. How to adjust the hyperparameters to the inputs of the model.
4. How to take advantage of step 2 to avoid over/under fitting.

v. Individual Contribution

We've all significantly contributed to the completion of this project. Most of the time, we've spent researching the model and sharing relevant resources. There was a lot of overlap in what each of us did because sometimes we simultaneously worked on the same parts of the assignment.

Emma: Model research, consultation with the TPM, data preparation, TensorFlow framework implementation, checking hyperparameters and testing results on Kaggle, write-up.

Hanna: Model research, consultation with the TPM, more TensorFlow framework implementation, more checking hyperparameters and testing results on Kaggle, write-up.

Shahrad: Model research, more checking hyperparameters and testing results on Kaggle, Jupyter notebook comments, readme file, write-up and organizing git-hub repo for submission.