

Assignment 4 Writeup

The goal of this assignment is to design and implement a system to classify images of clothing and fashion accessories among 10 categories. In MAIS 202, we studied multiple models for classification but when it comes to image recognition, Convolutional Neural Networks (CNN) are the best choice.

Implementation of the model:

Our dataset is made of 70000 images split into 3 batches: one to train, one to validate and one to test the model. Each of these images was preprocessed and turned into a numpy array of dimensions 28x28 with values ranging from 0 to 255 (brightness). This allows our model to make sense of them.

The convolutional neural network created by our model has 3 convolution layers, 2 pooling layers, 1 flattening and 2 dense layers. It was built and trained using Keras, an open source NN library that has the advantage of being very user-friendly and flexible.

Results:

The model submitted for the Kaggle competition has an accuracy score of 72%. It used to be lower but I optimized the neural network by tuning the hyperparameter called optimizer. The optimizer I used is called "Adam" and was also provided by Keras. It is an optimization algorithm used to train deep neural networks that uses two innovative techniques: adaptive learning rates (learning rates for weights are adjusted based on past gradients of weights) as well as momentum (smooths weight updates, prevents overshooting)

Challenges:

The hardest part was figuring out what kernels (convolution operations) to use to build the neural network. Fortunately other people have used the same model in the past and I reused the structure they applied to classify clothes (Source: [Very simple CNN for beginners to start CV | Kaggle](#)) The other challenge I faced is raising the accuracy score, but I still haven't found a way to make it any higher.

Conclusion:

In this assignment, I learned how to use a convolutional neural network to categorize images based on patterns found in images belonging to the same category. I also got to understand what Keras is and how to build a neural network using it.

Individual contribution:

The project was done individually.