Evagelos Petropoulos

Project 2 Part 1

Architecture choice (baseline CNN vs pretrained)

The baseline CNN I used for this project was ResNet18. I chose this model because it is the smallest and most lightweight model(*Roboflow Blog*). It is this way because compared to CNN models, it uses just, as its name suggests, 18 layers. Since it is simple and efficient, it is great as a starting point to train and test datasets. The pretrained model I selected off of HuggingFace was ResNet50 as it is very similar to ResNet18, the scope of it is just larger, with 50 layers to go through instead of the 18 that the simple model would go through. With this increase in layers should come an increase in accuracy, but that comes at a cost of time and computational resources(*Microsoft/Resnet-50 · Hugging Face*).

Training process and hyperparameters

The dataset was split into 80% training, 10% validation, and 10% testing. I included image augmentation in the training too like image rotation and horizontal flipping. This made it so there was less deviation from the standard of images being trained

The hyperparameters I used for both models were small batch sizes(8), learning rate of 0.001, the number of epochs was 3, and image size was set 112. The reason I did this was because it was taking too long to process and create my neural networks, and along with freezing some of the layers used in both CNN models, this greatly increased the process speed.

Results

Due to needing to reduce the size and quantity of the hyperparameters for the CNN model code to process and be created on my laptop, they suffered from a reduction in accuracy so they could be created within a day. The ResNet18 model had an accuracy of 67.93% over its 3 epochs, while the ResNet50 model had 40.23% accuracy. I did not include a confusion matrix in the code. I believe the reason for the reduced accuracy of the ResNet50 model is due to it using the same hyperparameters as the simpler model. Ideally, I would have a stronger CPU/GPU to use higher hyperparameters to get a more accurate result.

Works Cited

“Microsoft/Resnet-50 · Hugging Face.” *Microsoft/Resnet-50 · Hugging Face*, huggingface.co/microsoft/resnet-50. Accessed 23 Oct. 2025.

Writer, Contributing. “What Is Resnet-18? How to Use the Lightweight CNN Model.” *Roboflow Blog*, Roboflow Blog, 26 June 2025, blog.roboflow.com/resnet-18/.