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Project 2 - Developing Deep Learning Models

For my project I chose Option 2, gender classification from face images. I started simple, building a model from scratch and making tweaks to better my results. Tweaks I made included different image generation settings like rotation and horizontal flip, adding extra convolutional layers, of varying sizes, and changing the optimizer used. A lot of my time was spent trying to figure out why I was getting such horrible results - I eventually narrowed it down to the way I was matching the test data results with the names of the files in the submission CSV file. After that was sorted, my loss came down significantly. My final 'from-scratch' model ended with a loss value of about 0.30 as reported by the Kaggle leaderboards. This was slightly different than the results reported during training. Training ended with a validation accuracy in the high 80% range, and a validation loss of around 0.25. Clearly there is a measurable difference between the validation data and the test data. I attempted to build on this model by taking what I had learned and attempting to use transfer learning, using both VGG16 and ResNet50. In both instances, I was unsuccessful in training a model that was more successful than my model from scratch. I think this was due to an error in my implementation, but I cannot be sure. Results from training the last convolutional layers plus my own top model on VGG16 were promising, showing lower validation loss and higher validation accuracy than my from-scratch model, but when submitted to Kaggle resulted in loss of more than 0.90. As a final effort, I returned to my from-scratch model and attempted to tweak Adam optimizer hyperparameters, but found no significant positive changes.