

Gender and Ethnicity Classification

Performance Report by

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The number of data points after the split are as follows:

Training Data	Testing Data	Validation Data
14223	4741	4741

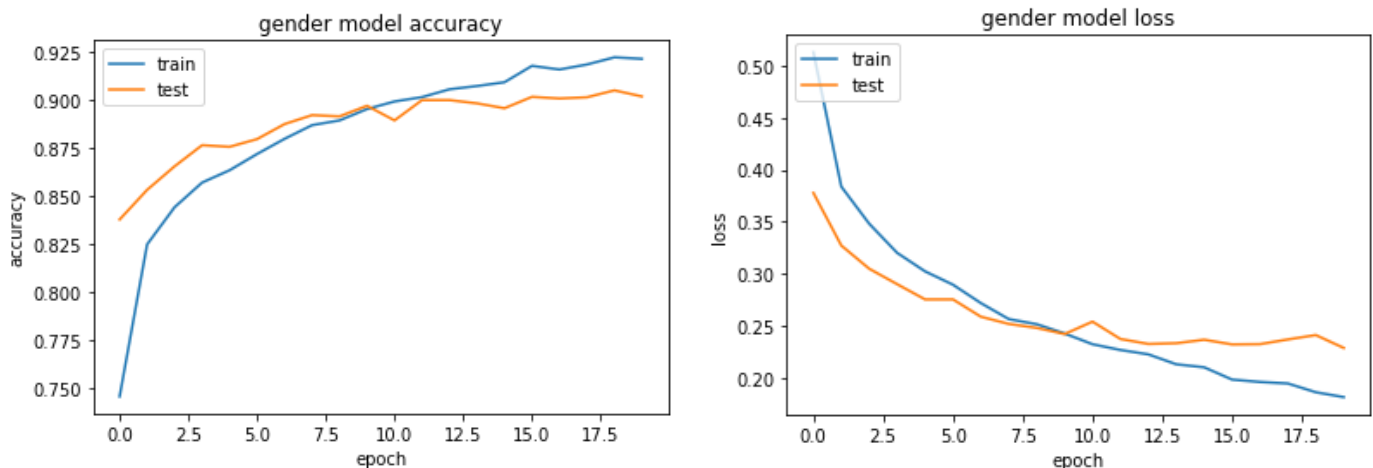
Observations:

Initially the training was very slow but I saw significant increase in the learning after using normalized data. I simply used a min max normalization as my data ranged between 0 to 255. The pickle files which I am submitting has normalized data so that my results can be regenerated.

Another observation I made about this data is that it is very much prone to overfitting and hence I introduced dropout layers in both the gender and ethnicity classification.

Gender Classification:

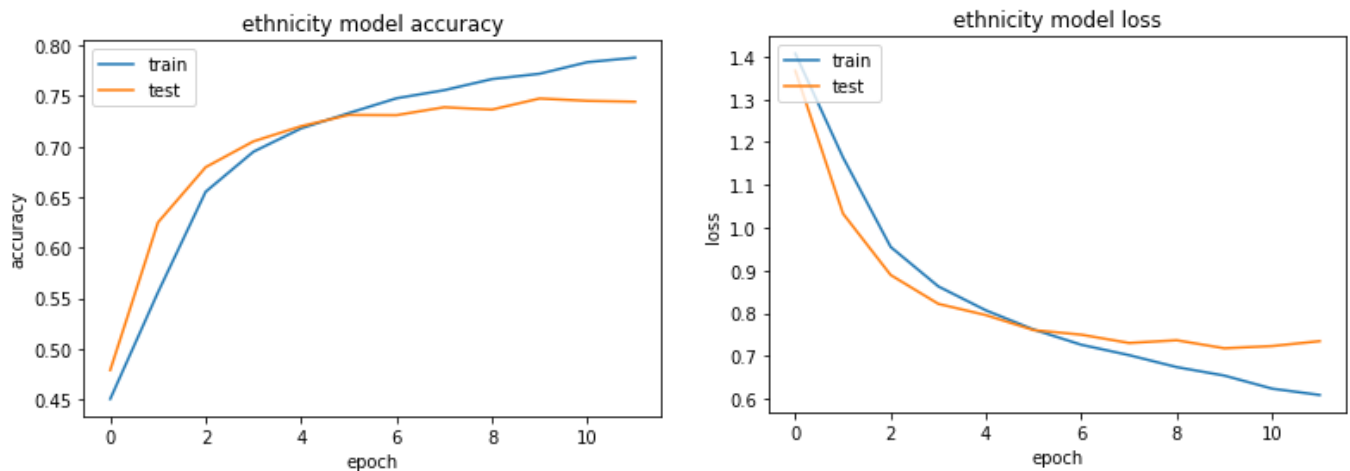
Below are the graphs which depicts the training progress through all the epochs :-



Having a high dropout rate and a very small learning rate helped achieve this best fit. Without dropout the training accuracy would reach 97% while the testing would start decreasing. Also changing the number of filters from 64 to 128 pushed the validation accuracy from 88 to 90 but no further improvement was noticed.

Ethnicity Classification:

Below are the graphs which depicts the training progress through all the epochs :-



This best fit was achieved with the help of early stopping and dropout before the output layer because just like the gender model this was also eagerly showing signs of overfitting.

After looking at the confusion matrix for the best model, where the ethnicity 0 was getting confused with the ethnicity 2, 3, and 4 a lot of times. We can conclude that it was hard to classify the images of class 0 because it would categorize it as all the other types of ethnicities very frequently. The confusion matrix can be found in the source code(commented out).

Conclusion:

After all the experimentation and training the performance of my best models are as follows:

	Gender Classification	Ethnicity Classification
Test Accuracy	90.15	74.44
Valid Accuracy	90.25	75.23

I think the gender classification did pretty good because after printing out some sample images even I could not classify some images based on gender, especially the new born babies.

Regarding the Ethnicity classification, I think colourful images would have been a better source to train for ethnicity prediction. Because colour plays an important role in identifying the ethnicity.