

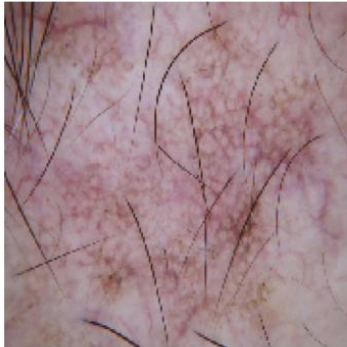
Summary of Melanoma detection assignment:

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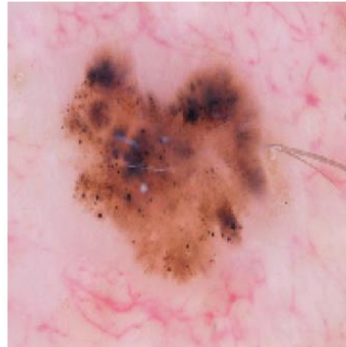
Key observations:

Example image from the 9 classes

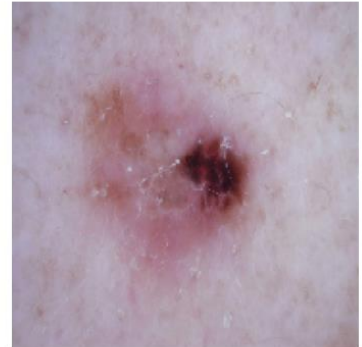
actinic keratosis



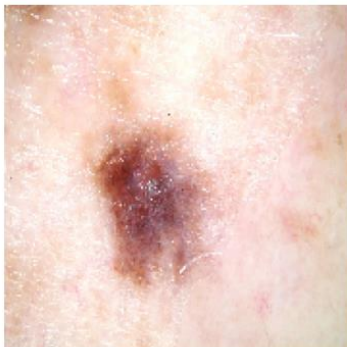
basal cell carcinoma



dermatofibroma



melanoma



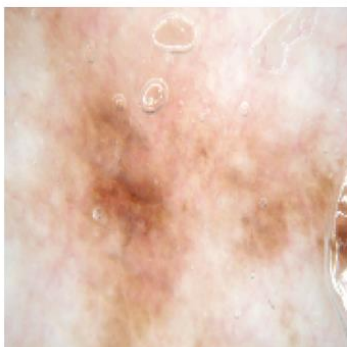
nevus



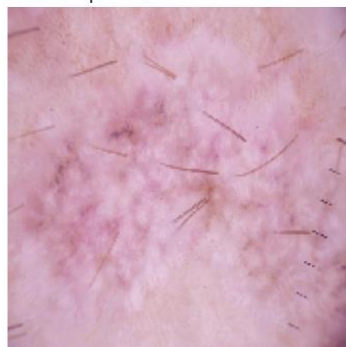
pigmented benign keratosis



seborrheic keratosis



squamous cell carcinoma



vascular lesion



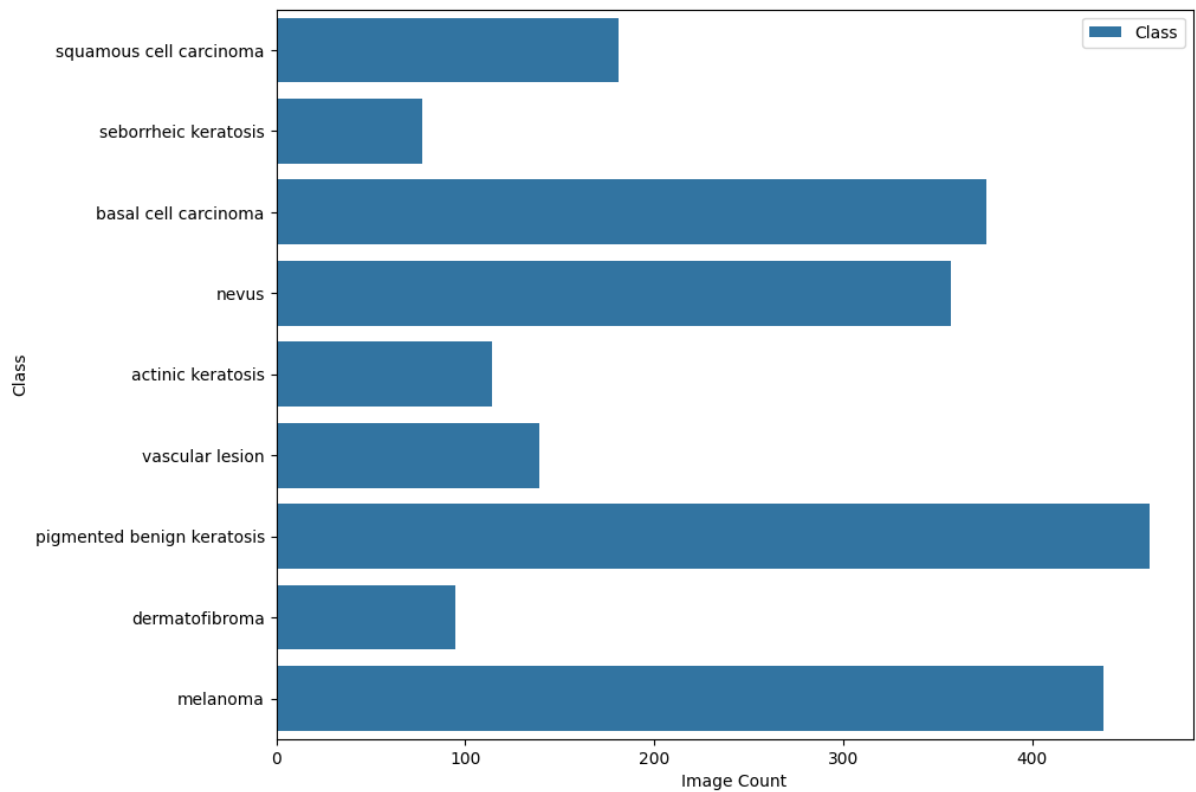
First model:



Findings from the first training and validation

- Epoch 20 indicates the maximum performance of the model at training accuracy of 80.6% and validation accuracy of 52.6%
- The big difference between training accuracy and validation accuracy indicates overfitting of the model
- We need to review the distribution of the class images used for training to see if there is a class imbalance that needs to be addressed.
- We should also include a third convolution layer and additional drop out layer to see if they improve the performance overall
- Additionally we can monitor validation accuracy as part of checkpoint and early stopping parameters while fitting the model.

The training dataset has class imbalance, as per the below picture



Using Augmentor library, we have added 500 images to all the classes to maintain some class balance

squamous cell carcinoma	500
seborrheic keratosis	500
basal cell carcinoma	500
nevus	500
actinic keratosis	500
vascular lesion	500
pigmented benign keratosis	500
dermatofibroma	500
melanoma	500

Improved Model and findings:



Observations from the improved training and validation

We have developed a CNN model to detect the 9 classes with a training and validation accuracy of >86%.

- Epoch 28 indicates the maximum performance of the model at training accuracy of 90.6% and validation accuracy of 86.5%
- The low difference between training accuracy and validation accuracy means that the overfitting found in the previous iteration of the model has been resolved
- The model training executed until Epoch 30 however the validation accuracy did not improve beyond Epoch 28
- Addressing class imbalance and adding a third convolution layer have really helped with improving the overall accuracy of the model and avoid overfitting

Model prediction:

Using the improved model trained, we predicted the class for two of the images in the test dataset.

Image 1:

Actual Class: basal cell carcinoma

Predictive Class: basal cell carcinoma

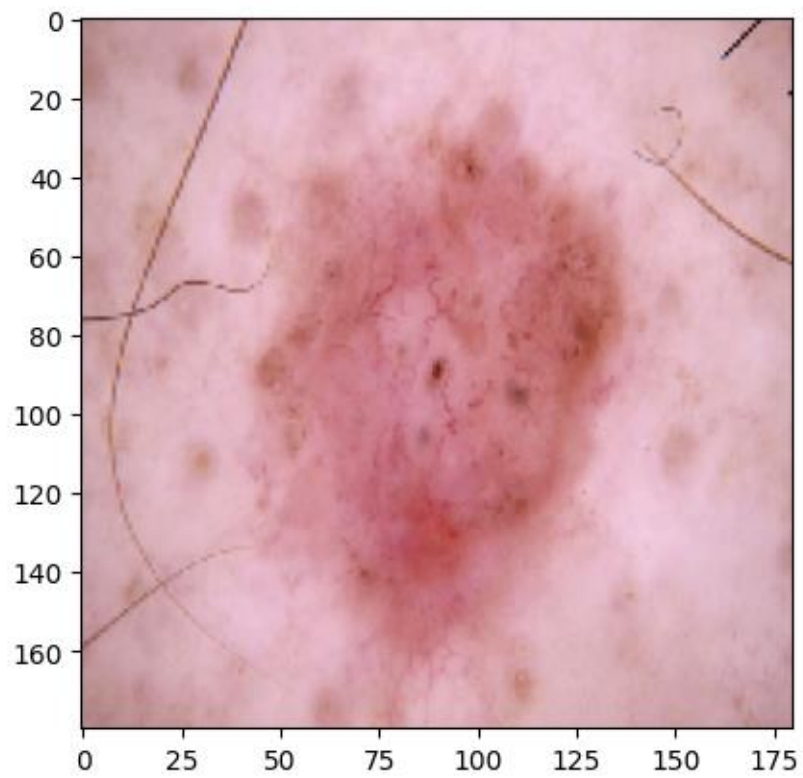


Image 2:

Actual Class: nevus

Predictive Class: nevus

