# Melanoma Detection Assignment

Problem statement: To build a CNN based model which can accurately detect melanoma. Melanoma is a type of cancer that can be deadly if not detected early. It accounts for 75% of skin cancer deaths. A solution that can evaluate images and alert dermatologists about the presence of melanoma has the potential to reduce a lot of manual effort needed in diagnosis.

The dataset consists of 2357 images of malignant and benign oncological diseases, which were formed from the International Skin Imaging Collaboration (ISIC). All images were sorted according to the classification taken with ISIC, and all subsets were divided into the same number of images, with the exception of melanomas and moles, whose images are slightly dominant.

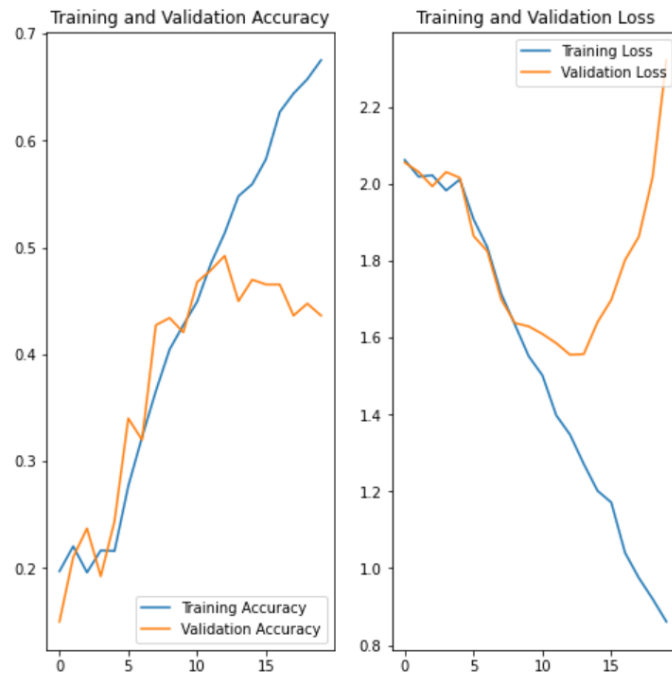The data set contains the following diseases:

- Actinic keratosis
- Basal cell carcinoma
- Dermatofibroma
- Melanoma
- Nevus
- Pigmented benign keratosis
- Seborrheic keratosis
- Squamous cell carcinoma
- Vascular lesion

Visualizing the data
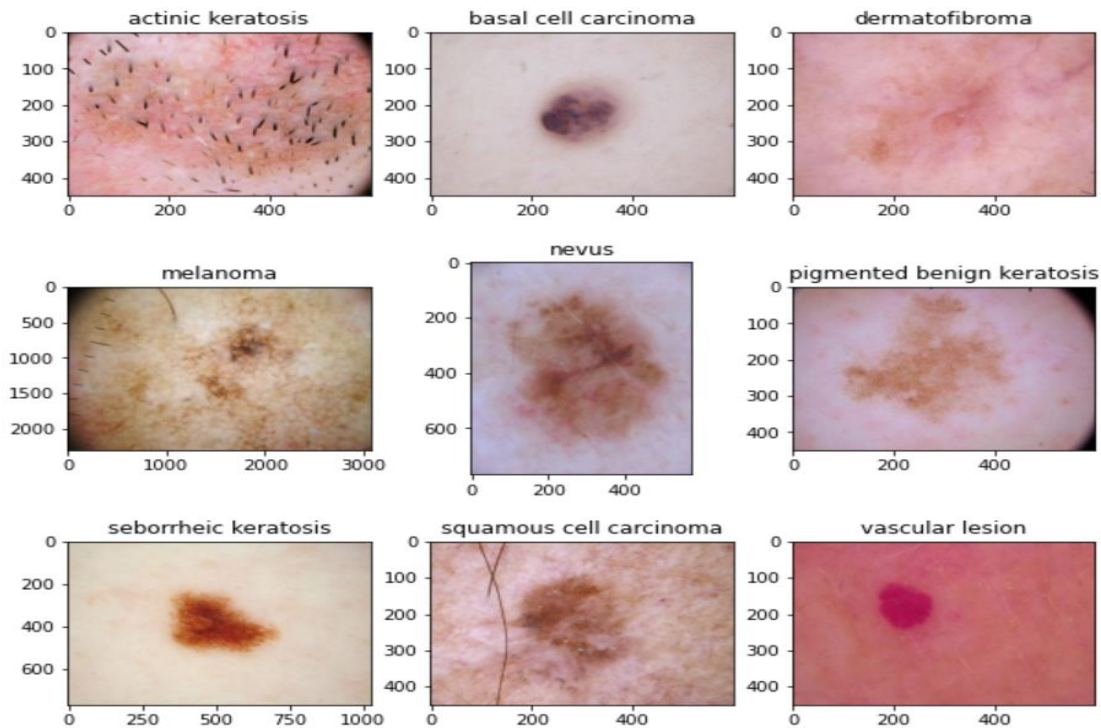
There are 9 classes in the data set
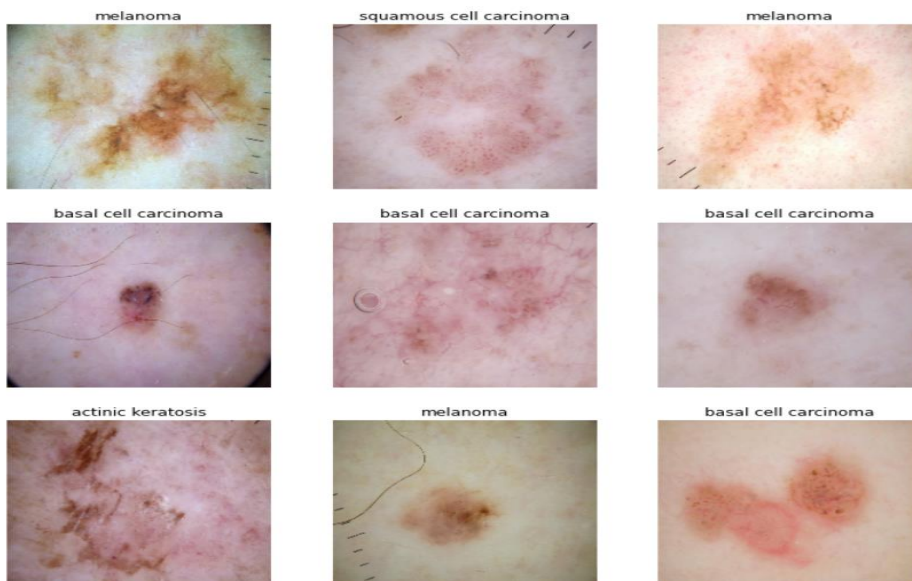
Building First model:

Observations from first base model:

- The model is overfitting as there is difference in loss functions in training & test
- The accuracy is around 67% because there are enough features to remember pattern
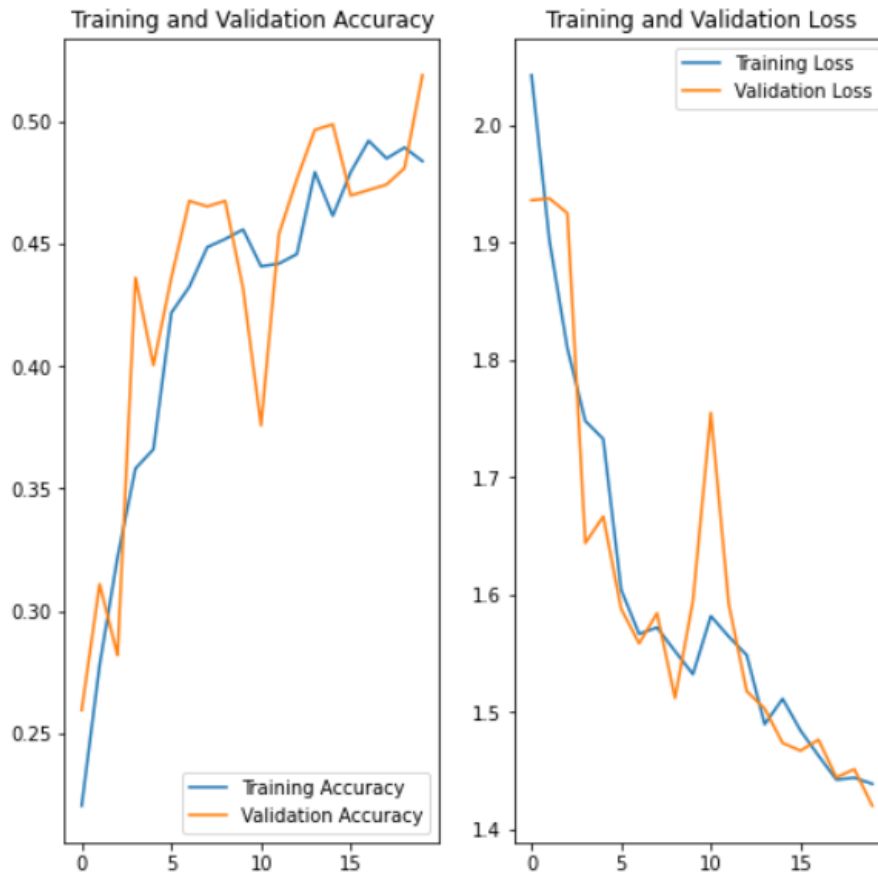
Data Augmentation

- Chose an adam data augmentation strategy to resolve underfitting/overfitting
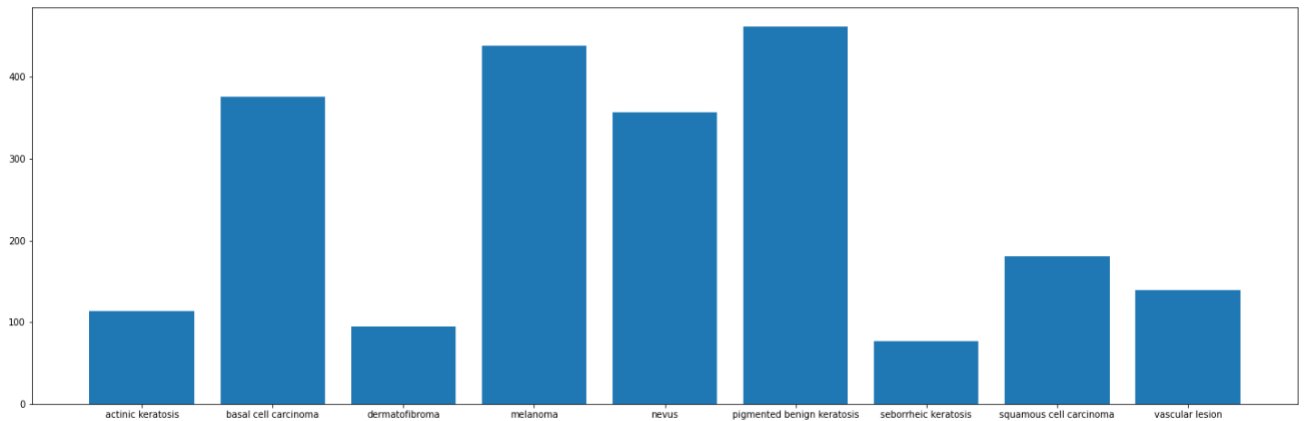

Data visualization

Model building:

Observations from Second Model:

- There is no improvement in accuracy but the overfitting problem has been solved due to data augmentation
- The model accuracy could be increased by using more epochs.

Class Imbalance

Observations:

- squamous cell carcinoma has least number of samples
- actinic keratosis and dermatofibroma have proportionate number of classes. melanoma and pigmented benign keratosis have proprtionate number of classes

Using Augmenter to solve class imbalance and building cnn model:

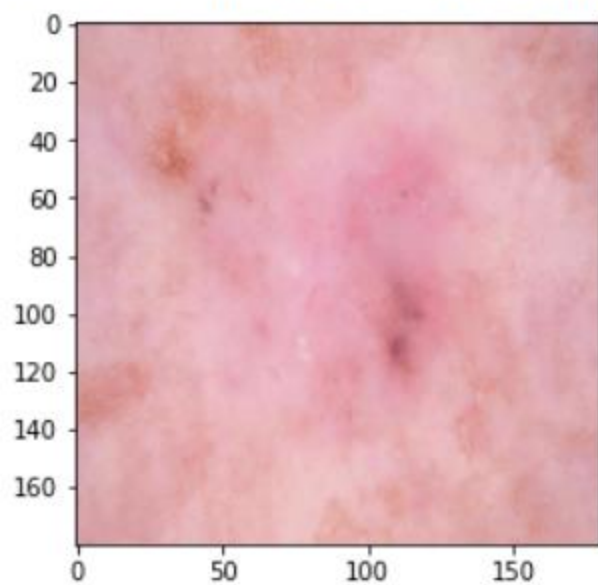The metrics were not changing hence the epochs were stopped using early stop
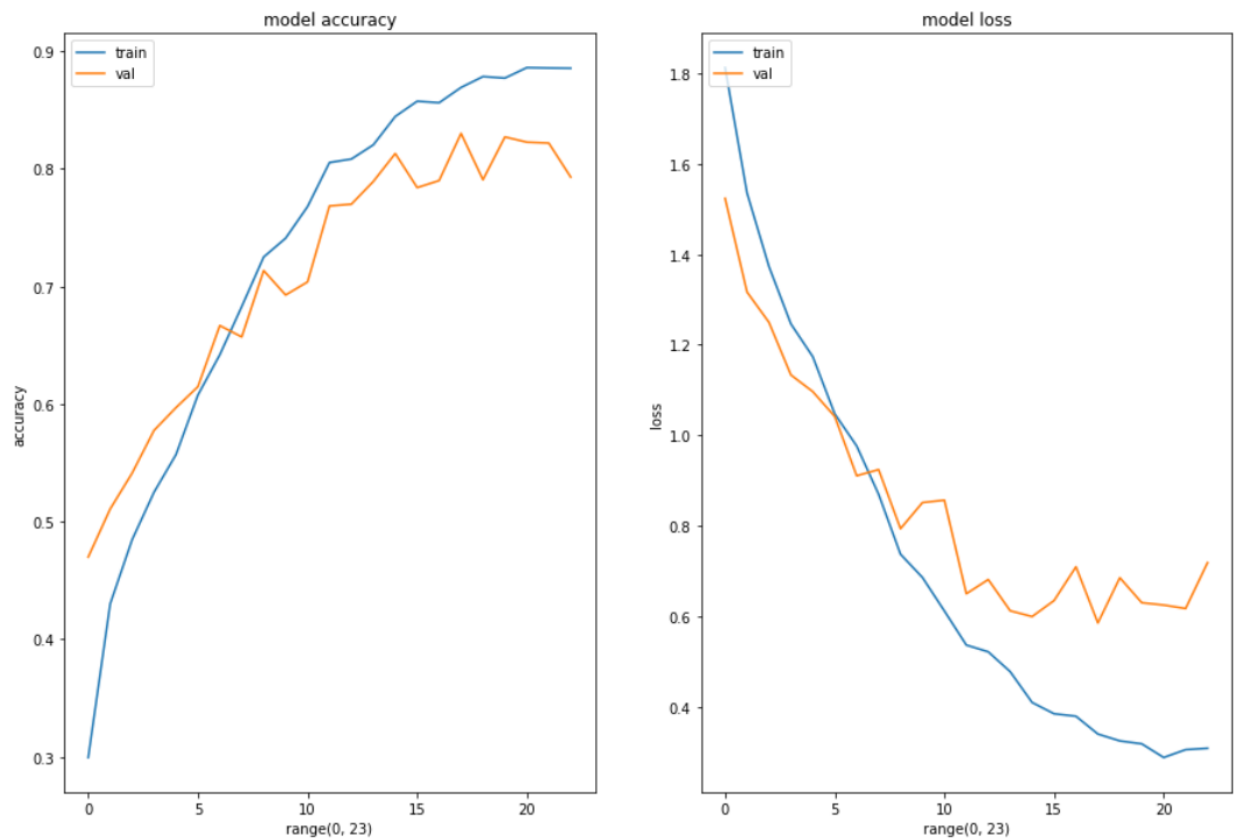
Observations from final model:

- The accuracy is around 88%

Model Prediction

Actual Class basal cell carcinoma
Predictive Class basal cell carcinoma

The model has correctly predicted the class