Skin Cancer Detection

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Section-A Batch-1

Define the problem statement

Skin cancer is one of the most dangerous forms of cancer. Skin cancer can be cured if early detected, but only highly-trained specialists are capable of accurately diagnosing skin cancer early. There is a severe shortage of experts and tools that can medically diagnose skin cancer accurately, so the innovation of computer-aided systems that can detect skin cancer could help in saving more lives at a low cost. Considering the seriousness of these issues, it's important to develop different skin cancer detection techniques.

Meta data of Data set

Dataset : ISIC Skin Cancer Challenge 2019

Domain - Computer Vision, Machine Learning
Sub-Domain - Deep Learning, Image Recognition
Techniques - Deep Convolutional Neural Network, XceptionNet
Application - Image Recognition, Image Classification, Medical Imaging

Dataset Details:

Dataset Name : ISIC Skin Cancer Images (Basal Cell Carcinoma vs Melanoma vs Nevus)

Number of class : 3

Number/Size of Images : Total : 12445 (555 MB)

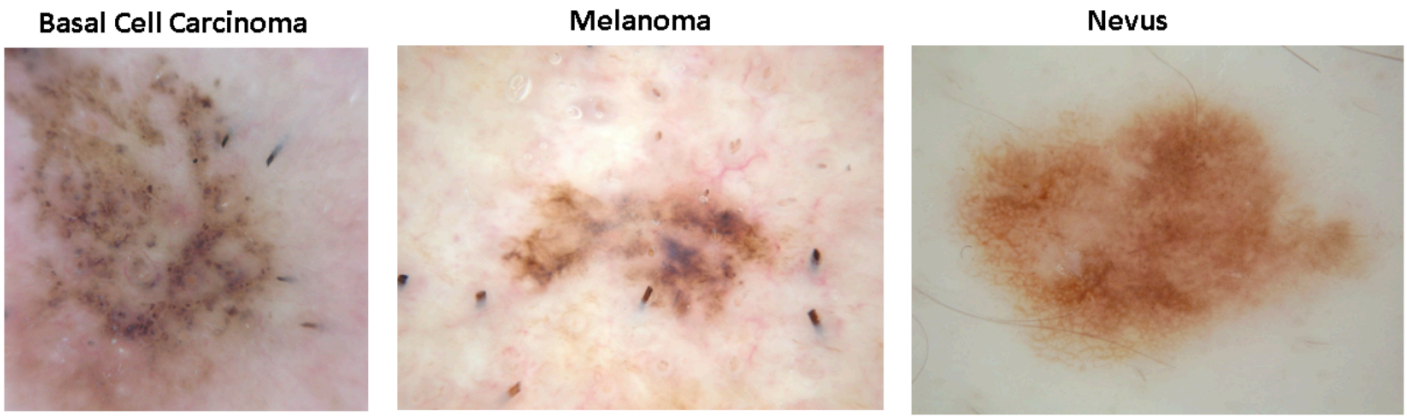
Training : 12295

Testing : 150

Distribution of images in training data for each class :

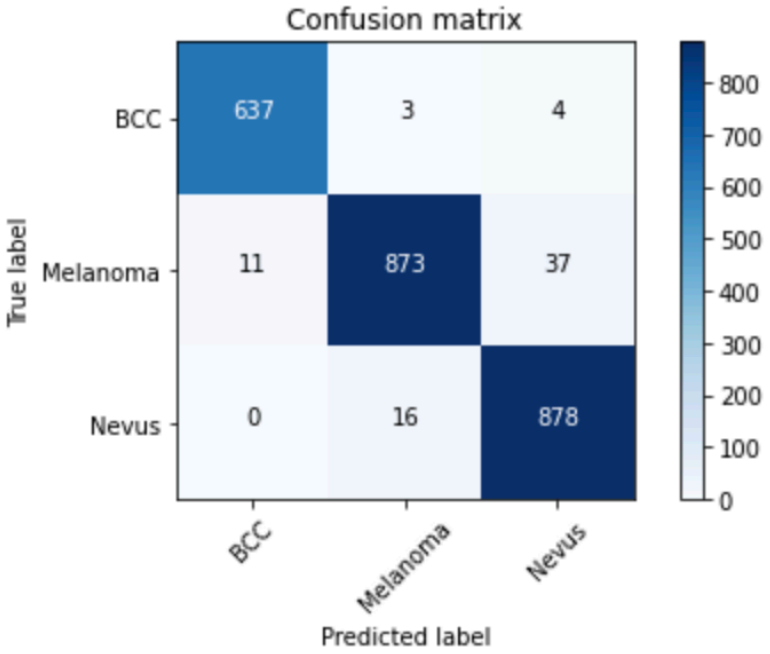
1. Basal Cell Carcinoma (3273)
2. Melanoma (4472)
3. Nevus (4550)

Sample images of Basal cell Carcinoma, Melanoma and Nevus are below



Model Selection : MobileNetV2

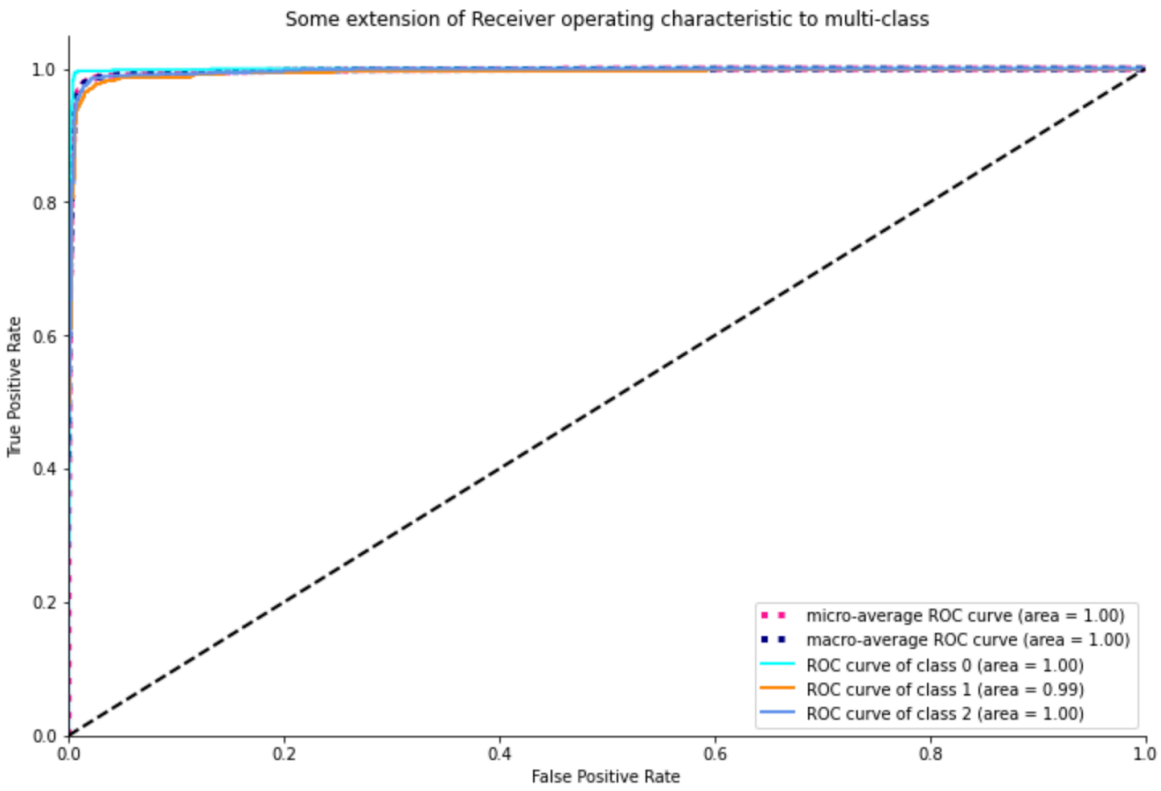
Confusion Matrix:



Model Report

Performance Metrics	
Test Accuracy	97.47%
Precision	97%
Sensitivity(BCC)	100%
Sensitivity(Melanoma)	96%
Sensitivity(Nevus)	98%
F1-score	98%
AUC	0.99

ROC



Preprocessing pipeline specific to data

Preprocessing, such as normalisation, image resizing, and data argumentation, needs to be done to eradicate the different biases in the dataset amid various classes.

Define Project Objective

Objective is to build a web application and leverage the Transfer Learning based deep CNN for detecting 3 major classes of skin cancer : Basal Cell Carcinoma, Nevus.