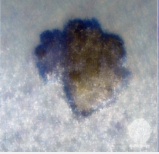
# Progress this week

## Pre-processing

Although we had done pre-processing like Normalization and applying Gaussian filters before, in order to satisfy the requirements of the projects we have taken following steps:

1. **Remove Artifacts** ( Hair, Ink Marks, etc)

A picture containing outdoor, mold

Description automatically generated 

* Convert the color image to a grayscale version.
* Applying Morphological Black-Hat transformation on the grayscale image
* Creating the mask for InPainting task
* Applying inpainting algorithm on the original image using the mask prepared from the grayscale image in step 3.

1. **Augmentation** to deal with the problem of skewed classes ,overfitting, and training image scarcity. Below are the following parameters considered

There are 7 classes namely:

|  |  |
| --- | --- |
| melanocytic nevi | 6705 |
| Melanoma | 1113 |
| Vascular | 142 |
| dermatofibroma | 115 |
| benign keratosis-like lesions | 1099 |
| basal cell carcinoma | 514 |
| Actinic keratoses and intraepithelial carcinoma / Bowen's disease | 327 |

As we can see, the class distribution is skewed, we have applied augmentation technique which alters the image to produce more training data. We have applied following augmentations on training data:

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Meaning** | **Value** |
| Rescale | Normalizes | 1/255 |
| Shear range | Changes the angle in counter clockwise direction (degrees) | 0.2 |
| Zoom range | Randomly zooms the image | 0.2 |
| Horizontal flip | Randomly flips Horizontally | True |
| Rotation Range | Degree range for random rotations | 10 |
| height\_shift\_range | Shift image along the height (in fractions of total height) | 0.2 |
| Width\_shift\_range | Shift image along the width (in fractions of total height) | 0.2 |
| Channel\_shift\_range | Range of random channel shifts | 10 |
| Fill\_mode | Padding | Nearest |

## Image Segmentation

* Dataset used – DermIS and DermQuest
* Created Image Masks using Segmentation
* Applied ResUnet architecture to develop CNN model for classifying image masks
* Evaluation Metrics:

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## CNN Model Building

We have used ResNet (Residual Network architecture). It uses an extremely deep CNN, and each residual unit is composed of

* Two convolutional layers
* Batch Normalization (BN)
* ReLU activation, using 3 × 3 kernels and preserving spatial dimensions (stride 1, SAME padding).

For 20 Epochs, maximum accuracy = 70%

# Plan for next 2 weeks

* Try out different CNN architectures with hyperparameter tuning.
* Build proposed custom architectures based on research papers.
* Develop models on ISIC 2019 and 2020(?) datasets.
* Test on DermIS and DermQuest datasets (provided by Waterloo University)