



Skin Lesion Classification: Cancer or Not?

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01

Introduction

The Goal of the Project





Business Problem:

To reduce diagnosis timings for doctors by building an algorithm that can read images of skin lesions and determine if it is malignant (cancerous) or benign (not).



02

What is Skin Cancer?

A brief description

What is Skin Cancer?



2 Main Layers

Epidermis (outer) &
dermis (inner) skin



Epidermis

Is where skin cancer
starts



UV Rays

From the sun and
tanning beds is the
most common cause



Basal

Most common



Squamous

2nd, and can be cured like
basal though costly



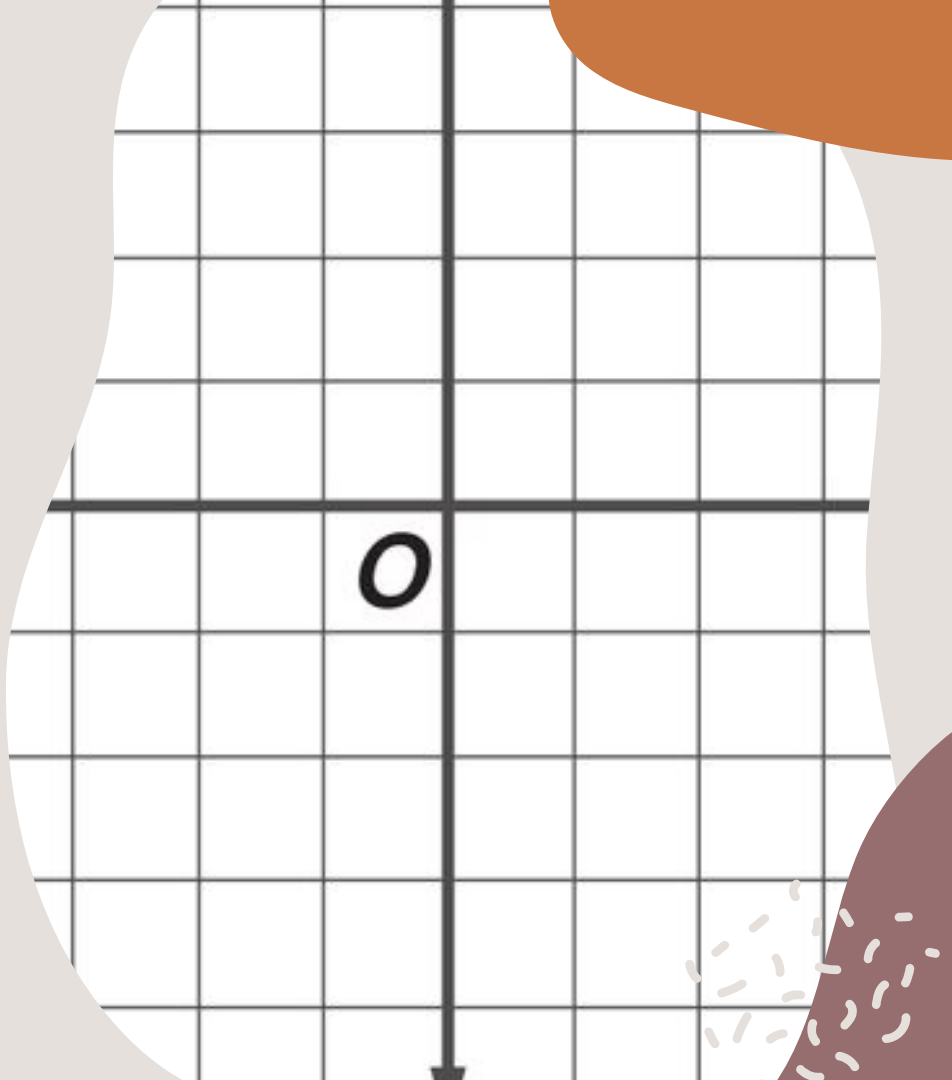
Melanoma

3rd most common but
deadliest

03

The Data

Sourcing & Preprocessing



The Data

1 Sourced

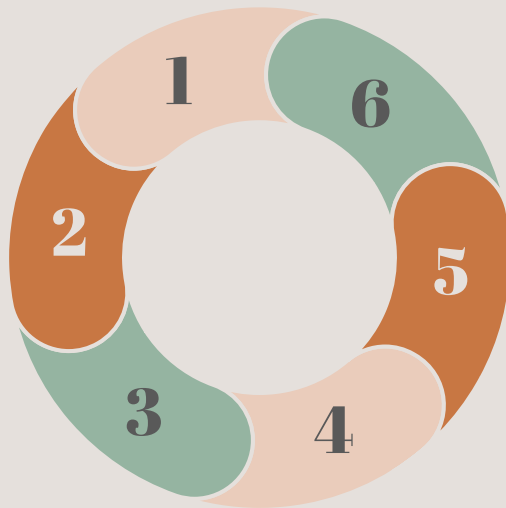
From dermascopy.org, cancer.com, & more

2 Size

Contains over 28,000 images of skin lesions

3 Structure

Contains 2 subsets "train" & "test", each with "benign" & "malignant" folders



Distribution 4

Is balanced w/ a near even distribution

Augmentation 5

4 of the 5 models were fed augmented data

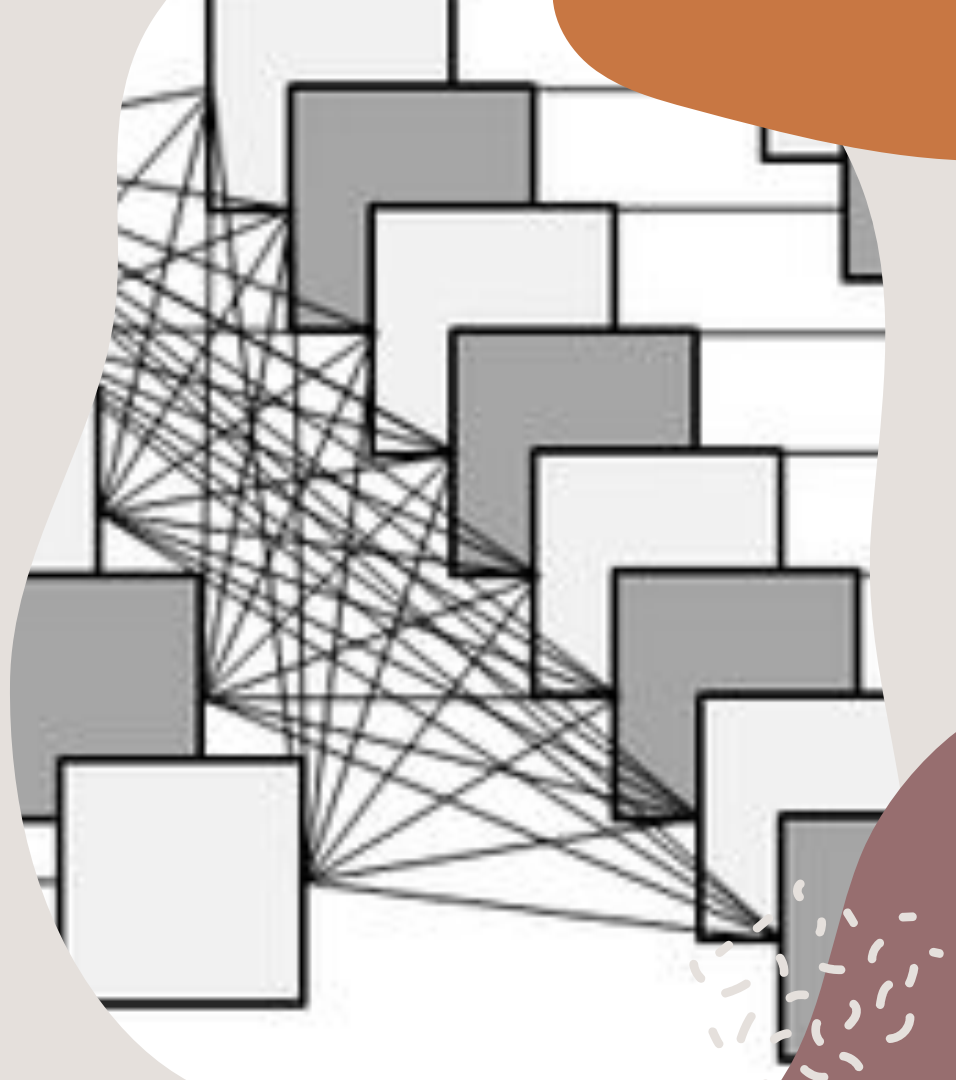
Normalization 6

Images were scaled to 256 colors (0-255)

04

Modeling

The Models & Evaluation



Convolutional Neural Network (CNN)

4 Final Models

Out of 20 tested

Pre-trained

EfficientNet-B0 and ResNet50 were included. The latter performed the best.

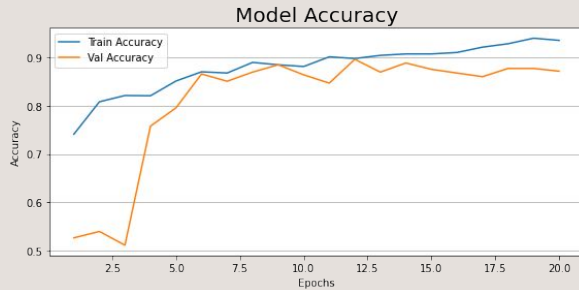
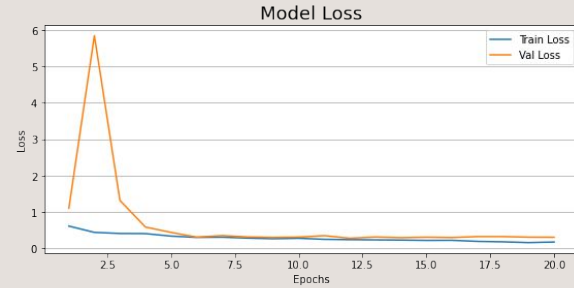
30 Epochs

Each has at least 30 epochs

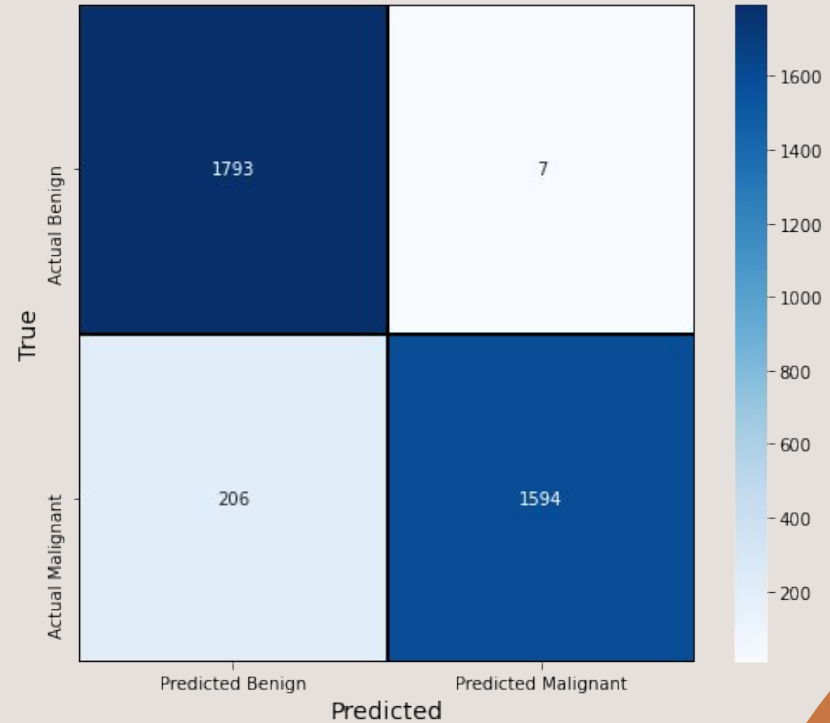
```
base_model= ResNet50(include_top=False, weights="imagenet", input_shape=(height, width,3))
model4= Sequential()
model4.add(base_model)
model4.add(Conv2D(64, (3, 3), activation = 'relu'))
model4.add(Dropout(0.2))
model4.add(Conv2D(64, (3, 3), activation = 'relu'))
model4.add(MaxPooling2D(pool_size = (2, 2)))
model4.add(Dropout(0.2))
model4.add(Flatten())
model4.add(Dense(512,activation='relu'))
model4.add(Dense(256,activation='relu'))
model4.add(Dropout(0.2))
model4.add(Dense(128,activation='relu'))
model4.add(Dense(64,activation='relu'))
model4.add(Dense(32,activation='relu'))
model4.add(Dense(16,activation='relu'))
model4.add(Dense(8,activation='relu'))
model4.add(Dense(2, activation='softmax'))
model4.summary()
```

ResNet50 model architecture

Model Evaluation



Model's accuracy and loss plots



1 out of 9 misdiagnosed as healthy
1 in 257 misdiagnosed as cancer

Conclusion

This project has shown how to classify benign or malignant diagnosis' from a skin lesion image. This tool can assist the medical industry and patients in providing quicker diagnosis.

Recommendations

- Re-run the models on larger datasets.
- Re-run some of the models with a greater number of epochs (such as 100 or more on the ones with 30)
- Fine tune and test other parameters to reduce overfitting
- Build models for more complex problems, such as determining the types of cancers, skin diseases related to Agent Orange and more.
- Output the model to a user friendly application, preferably a web app.



Thanks!

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