# Skin Lesion Classification: Cancer or Not?

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# Introduction

The Goal of the Project

# Business Problem:

To assist doctors in giving quicker diagnoses

# 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

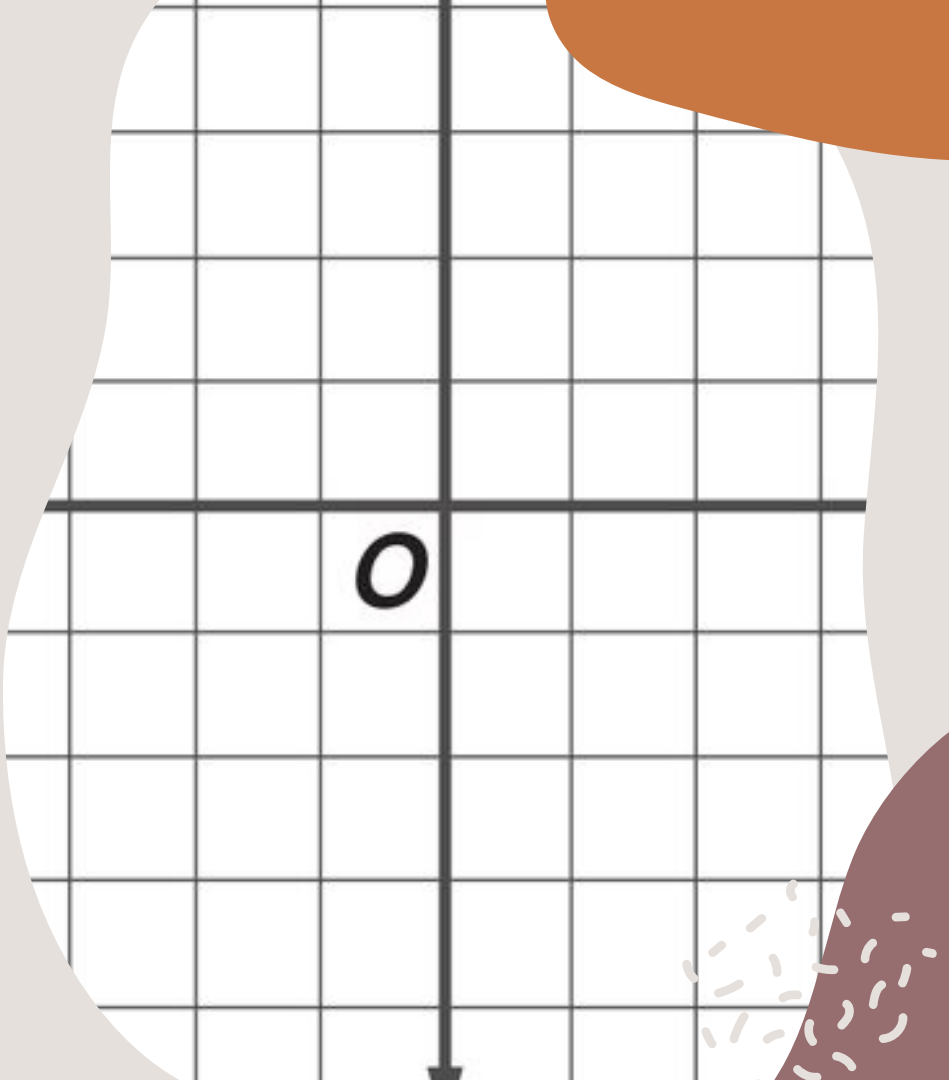
## Melanoma

3rd most common but deadliest

# 03

# The Data

Sourcing & Preprocessing



# The Data

1 **Sourced**

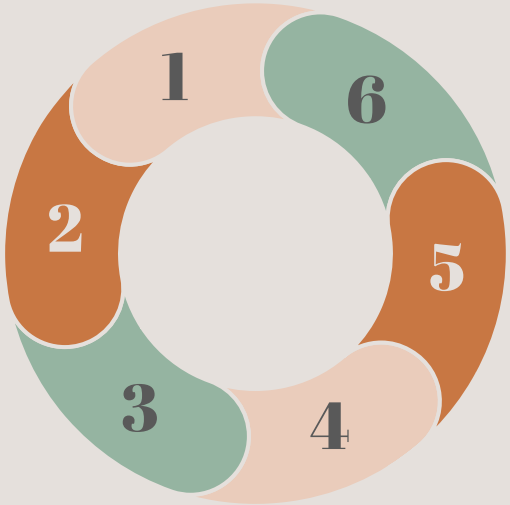
From dermascopy.org, cancer.com, & more

2 **Size**

Contains over 28,000 images of skin lesions

3 **Structure**

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




4 **Distribution**

Is balanced w/ a near even distribution

5 **Augmentation**

3 of the 4 models were fed augmented data

6 **Normalization**

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

EfficientNetB0 was included.

## 30 Epochs

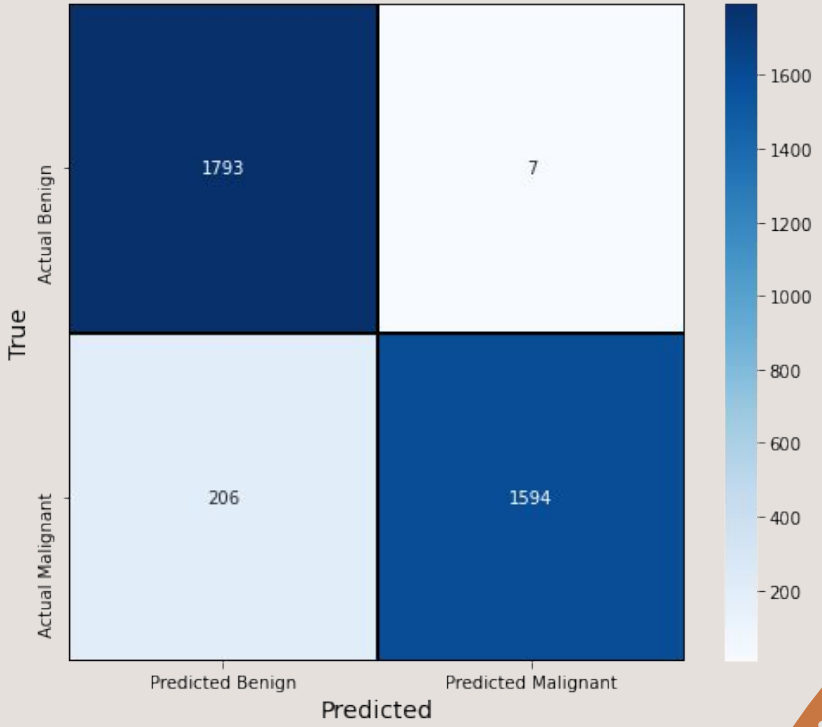
Each has at least 30 epochs

```
eff_net = efn.EfficientNetB0(weights='imagenet', include_top=False, input_shape=(128, 128, 3))
model4=Sequential()
model4.add(eff_net)
model4.add(layers.GlobalAveragePooling2D())
model4.add(Dense(128, activation='relu'))
model4.add(BatchNormalization())
model4.add(Dense(2, activation='softmax'))

#Setting kernel regularizer: <--this is done to help lessen the chances of overfitting the model (7)
alpha = 1e-3
for layer in model4.layers:
    if isinstance(layer, keras.layers.Conv2D) or isinstance(layer, keras.layers.Dense):
        layer.add_loss(lambda: keras.regularizers.l2(alpha)(layer.kernel))
    if hasattr(layer, 'bias_regularizer') and layer.use_bias:
        layer.add_loss(lambda: keras.regularizers.l2(alpha)(layer.bias))


model4.summary()
```

EfficientNetB0 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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