Skin Cancer Detection using CNN

Dataset: HAM10000, ISIC 2018

Group: A-02

Import all the Dependencies

In [1]:

```
import tensorflow as tf
from tensorflow.keras import models, layers
import matplotlib.pyplot as plt
from IPython.display import HTML
```

Set all the Constants

In [2]:

```
BATCH_SIZE = 32
IMAGE_SIZE = 256
CHANNELS = 3
EPOCHS = 30
```

Import data into tensorflow dataset object

In [3]:

```
dataset = tf.keras.preprocessing.image_dataset_from_directory(
    "../Dataset/CancerDetection",
    seed = 123,
    shuffle = True,
    image_size = (IMAGE_SIZE,IMAGE_SIZE),
    batch_size = BATCH_SIZE
)
```

```
Found 3297 files belonging to 2 classes.
```

Class Names

In [4]:

```
class_names = dataset.class_names
class_names
```

Out[4]:

```
['benign', 'malignant']
```

Batch and Image size

In [5]:

```
for image_batch, labels_batch in dataset.take(1):
    print(image_batch.shape)
    print(labels_batch.numpy())
```

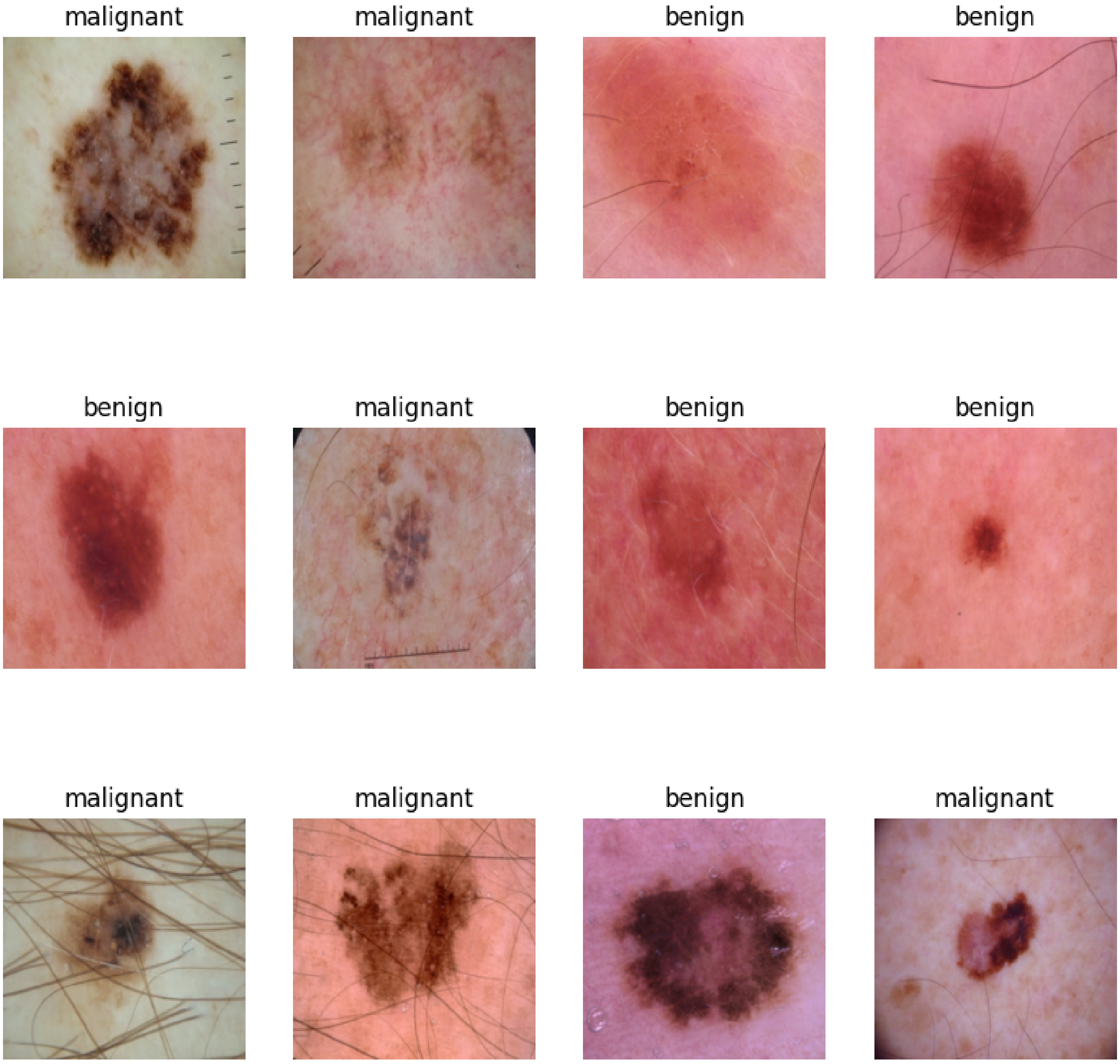
```
(32, 256, 256, 3)
[1 0 1 0 1 1 0 1 0 0 0 0 0 1 0 1 0 1 0 0 1 1 1 0 1 0 1 0 0 1 1 0]
```

Visualize some of the images from our dataset

In [6]:

```
plt.figure(figsize=(10, 10))

for image_batch, labels_batch in dataset.take(1):
    for i in range(12):
        ax = plt.subplot(3, 4, i + 1)
        plt.imshow(image_batch[i].numpy().astype("uint8"))
        plt.title(class_names[labels_batch[i]])
        plt.axis("off")
```



Function to Split Dataset

Dataset should be bifurcated into 3 subsets, namely:

1. Training: Dataset to be used while training
2. Validation: Dataset to be tested against while training
3. Test: Dataset to be tested against after we trained a model

In [7]:

```
len(dataset)
```

Out[7]:

```
104
```

In [8]:

```
train_size = 0.8
len(dataset)*train_size
```

Out[8]:

```
83.2
```

In [9]:

```
train_ds = dataset.take(83)
len(train_ds)
```

Out[9]:

```
83
```

In [10]:

```
test_ds = dataset.skip(83)
len(test_ds)
```

Out[10]:

```
21
```

In [11]:

```
val_size = 0.1
len(dataset)*val_size
```

Out[11]:

```
10.4
```

In [12]:

```
val_ds = test_ds.take(10)
len(val_ds)
```

Out[12]:

```
10
```

In [13]:

```
test_ds = test_ds.skip(10)
len(test_ds)
```

Out[13]:

```
11
```

Function to Split Dataset into Training, Testing & Validating Dataset

In [14]:

```
def get_dataset_partitions_tf(ds, train_split=0.8, val_split=0.1, test_split=0.1, shuffl
    assert (train_split + test_split + val_split) == 1

    ds_size = len(ds)

    if shuffle:
        ds = ds.shuffle(shuffle_size, seed=12)

    train_size = int(train_split * ds_size)
    val_size = int(val_split * ds_size)

    train_ds = ds.take(train_size)
    val_ds = ds.skip(train_size).take(val_size)
    test_ds = ds.skip(train_size).skip(val_size)

    return train_ds, val_ds, test_ds
```

In [15]:

```
train_ds, val_ds, test_ds = get_dataset_partitions_tf(dataset)
```

In [16]:

```
len(train_ds)
```

Out[16]:

```
83
```

In [17]:

```
len(val_ds)
```

Out[17]:

```
10
```

In [18]:

```
len(test_ds)
```

Out[18]:

```
11
```

Cache, Shuffle, and Prefetch the Dataset

In [19]:

```
train_ds = train_ds.cache().shuffle(1000).prefetch(buffer_size=tf.data.AUTOTUNE)

val_ds = val_ds.cache().shuffle(1000).prefetch(buffer_size=tf.data.AUTOTUNE)

test_ds = test_ds.cache().shuffle(1000).prefetch(buffer_size=tf.data.AUTOTUNE)
```

Building the Model

Creating a Layer for Resizing and Normalization

In [20]:

```
resize_and_rescale = tf.keras.Sequential([

  layers.experimental.preprocessing.Resizing(IMAGE_SIZE, IMAGE_SIZE),
  layers.experimental.preprocessing.Rescaling(1./255),

])
```

In [ ]: