Model Development Phase Template

Date	19 july 2024
Team ID	SWTID1720084639
Project Title	Beneath the Waves: Unraveling Coral Mysteries through Deep Learning
Maximum Marks	10 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

Initial Model Training Code (5 marks):

```python
from keras.optimizers import Adam
#opt = Adam(lr=0.001)

vggmodel.compile(loss = 'categorical_crossentropy' , metrics =['accuracy'])

labels = ['bleached','healthy']

import numpy as np
img = '/content/drive/MyDrive/test/healthy/14307809941_27b4257449_o.jpg'
img = load_img(img, target_size=(299,299))
x = img_to_array(img)
x = preprocess_input(x)
preds = vggmodel.predict(np.array([x]))
preds

1/1 [==============================] - 0s 238ms/step
array([[5.6030145e-15, 1.0000000e+00]], dtype=float32)

labels[np.argmax(preds)]

'healthy'
```

Model Validation and Evaluation Report (5 marks):

Model	Summary	Training and Validation Performance Metrics
| VGG16 | ```
Layer (type)              Output Shape            Param #
=================================================================
vgg16 (Functional)        (None, 9, 9, 512)       14714688

flatten (Flatten)         (None, 41472)           0

dense (Dense)             (None, 256)             10617088

dropout (Dropout)         (None, 256)             0

dense_1 (Dense)           (None, 2)               514

=================================================================
Total params: 25332290 (96.64 MB)
Trainable params: 10617602 (40.50 MB)
Non-trainable params: 14714688 (56.13 MB)
``` |  |
| RESNET | ```
Layer (type)              Output Shape            Param #
=================================================================
resnet50 (Functional)     (None, 10, 10, 2048)    23587712

flatten_1 (Flatten)       (None, 204800)          0

dense_2 (Dense)           (None, 256)             52429056

dropout_1 (Dropout)       (None, 256)             0

dense_3 (Dense)           (None, 2)               514

=================================================================
Total params: 76017282 (289.98 MB)
Trainable params: 52429570 (200.00 MB)
Non-trainable params: 23587712 (89.98 MB)
``` |  |

| **INCEPTION** | ```
Layer (type)                Output Shape           Param #
=================================================================
 inception_v3 (Functional)  (None, 8, 8, 2048)     21802784

 global_average_pooling2d (  (None, 2048)           0
 GlobalAveragePooling2D)

 dense_4 (Dense)            (None, 256)             524544

 dropout_2 (Dropout)        (None, 256)             0

 dense_5 (Dense)            (None, 2)               514

=================================================================
Total params: 22327842 (85.17 MB)
Trainable params: 525058 (2.00 MB)
Non-trainable params: 21802784 (83.17 MB)
``` |  |
| **DENSENET** | ```
Layer (type)                Output Shape           Param #
=================================================================
 densenet121 (Functional)   (None, 9, 9, 1024)     7037504

 global_average_pooling2d_1  (None, 1024)           0
  (GlobalAveragePooling2D)

 dense_6 (Dense)            (None, 256)             262400

 dropout_3 (Dropout)        (None, 256)             0

 dense_7 (Dense)            (None, 2)               514

=================================================================
Total params: 7300418 (27.85 MB)
Trainable params: 262914 (1.00 MB)
Non-trainable params: 7037504 (26.85 MB)
``` |  |
| **XCEPTION** | ```
Layer (type)                Output Shape           Param #
=================================================================
 xception (Functional)      (None, 10, 10, 2048)   20861480

 global_average_pooling2d_2  (None, 2048)           0
  (GlobalAveragePooling2D)

 dense_8 (Dense)            (None, 256)             524544

 dropout_4 (Dropout)        (None, 256)             0

 dense_9 (Dense)            (None, 2)               514

=================================================================
Total params: 21386538 (81.58 MB)
Trainable params: 525058 (2.00 MB)
Non-trainable params: 20861480 (79.58 MB)
``` |  |