Project Development Phase

Model Performance Test

Date	10 November 2022
Team ID	PNT2022TMID41315
Project Name	Classification of Arrhythmia by Using Deep Learning with 2-D ECG Spectral Image Representation
Maximum Marks	10 Marks

Model Performance Testing:

S.No.	Parameter	Values
1.	Model Summary	We are creating a model for predicting 6 classification of ECG images.
2.	Accuracy	Training Accuracy - 100% Validation Accuracy - 99.8%

Screenshots:
1.Model Summary

[23]:
```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 62, 62, 32)        896

 max_pooling2d (MaxPooling2D  (None, 31, 31, 32)       0
 )

 conv2d_1 (Conv2D)           (None, 29, 29, 32)        9248

 max_pooling2d_1 (MaxPooling  (None, 14, 14, 32)       0
 2D)

 flatten (Flatten)           (None, 6272)              0

 dense (Dense)               (None, 128)               802944

 dense_1 (Dense)             (None, 128)               16512

 dense_2 (Dense)             (None, 128)               16512

 dense_3 (Dense)             (None, 128)               16512

 dense_4 (Dense)             (None, 128)               16512

 dense_5 (Dense)             (None, 6)                 774

=================================================================
Total params: 879,910
Trainable params: 879,910
Non-trainable params: 0
_________________________________________________________________
```

2.1 Training Accuracy

Train the model:

[25]:
```
model.fit_generator(generator=x_train,steps_per_epoch = len(x_train), epochs=9, validation_data=x_test,validation_steps = len(x_test))
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future versi
on. Please use `Model.fit`, which supports generators.
  """Entry point for launching an IPython kernel.
Epoch 1/9
480/480 [==============================] - 41s 66ms/step - loss: 1.3631 - accuracy: 0.5007 - val_loss: 1.6149 - val_accuracy: 0.4544
Epoch 2/9
480/480 [==============================] - 31s 65ms/step - loss: 0.7976 - accuracy: 0.6908 - val_loss: 0.9267 - val_accuracy: 0.6988
Epoch 3/9
480/480 [==============================] - 34s 71ms/step - loss: 0.3399 - accuracy: 0.8819 - val_loss: 0.6958 - val_accuracy: 0.7965
Epoch 4/9
480/480 [==============================] - 30s 63ms/step - loss: 0.2286 - accuracy: 0.9223 - val_loss: 0.5724 - val_accuracy: 0.8095
Epoch 5/9
480/480 [==============================] - 30s 63ms/step - loss: 0.1798 - accuracy: 0.9439 - val_loss: 0.4829 - val_accuracy: 0.8488
Epoch 6/9
480/480 [==============================] - 30s 63ms/step - loss: 0.1416 - accuracy: 0.9555 - val_loss: 0.5124 - val_accuracy: 0.8549
Epoch 7/9
480/480 [==============================] - 30s 62ms/step - loss: 0.1068 - accuracy: 0.9662 - val_loss: 0.5708 - val_accuracy: 0.8585
Epoch 8/9
480/480 [==============================] - 30s 63ms/step - loss: 0.0917 - accuracy: 0.9710 - val_loss: 0.4615 - val_accuracy: 0.8714
Epoch 9/9
480/480 [==============================] - 30s 62ms/step - loss: 0.0796 - accuracy: 0.9750 - val_loss: 0.7387 - val_accuracy: 0.8535
```

[25]:

2.2 Validation Accuracy

[32]:
```
img
```

[32]:


[33]:
```
import numpy as np
```

[34]:
```
x=np.expand_dims(x,axis=0)
```

[35]:
```
pred = model.predict(x)
y_pred=np.argmax(pred)
y_pred
```

```
1/1 [==============================] - 0s 151ms/step
```

[35]:
```
4
```

[36]:
```
index=['left Bundle Branch block',
       'Normal',
       'Premature Atrial Contraction',
       'Premature Ventricular Contraction',
       'Right Bundle Branch Block',
       'Ventricular Fibrillation']
```

[37]:
```
result = str(index[y_pred])
result
```

[37]:
```
'Right Bundle Branch Block'
```