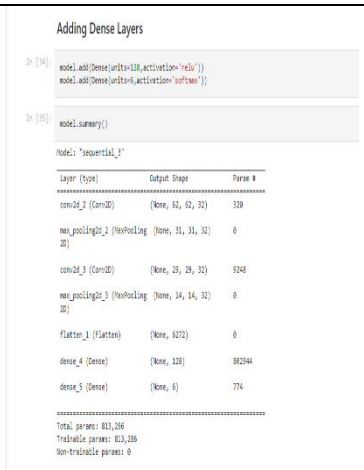
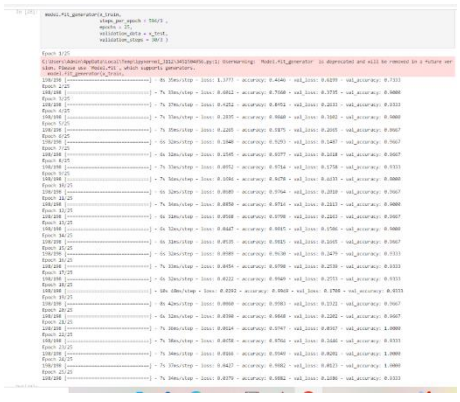
**Project Development Phase Model**
**Performance Test**

| | |
|---|---|
| Date | 18 November 2022 |
| Team ID | PNT2022TMID00221 |
| Project Name | A Gesture-based Tool for Sterile Browsing of Radiology Images |
| Maximum Marks | 10 Marks |

**Model Performance Testing:**

Project team shall fill the following information in model performance testing template.

| S.No. | Parameter | Values | Screenshot |
|---|---|---|---|
| 1. | Model Summary | conv2d (Conv2D) - 320<br>max_pooling2d (MaxPooling2D) - 0 conv2d_1 (Conv2D) - 9248<br>max_pooling2d_1 (MaxPooling2D) - 0 flatten (Flatten) - 0 dense (Dense) - 802944 dense_1 (Dense) - 774<br><br>==========<br>Total params: 813,286<br>Trainable params: 813,286<br>Non-trainable params: 0 |  |
| 2. | Accuracy | Training Accuracy - 98.82%<br><br>Validation Accuracy – 93.33% |  |

| | | | |
|---|---|---|---|
| 3. | Confidence Score (Only Yolo Projects) | Class Detected -<br><br>Confidence Score - | NA |

Screenshots:

1. Model Summary:

## Adding Dense Layers

In [34]:
```
model.add(Dense(units=128,activation='relu'))
model.add(Dense(units=6,activation='softmax'))
```

In [35]:
```
model.summary()
```

```
Model: "sequential_3"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d_2 (Conv2D)           (None, 62, 62, 32)        320

 max_pooling2d_2 (MaxPooling  (None, 31, 31, 32)       0
 2D)

 conv2d_3 (Conv2D)           (None, 29, 29, 32)        9248

 max_pooling2d_3 (MaxPooling  (None, 14, 14, 32)       0
 2D)

 flatten_1 (Flatten)         (None, 6272)              0

 dense_4 (Dense)             (None, 128)               802944

 dense_5 (Dense)             (None, 6)                 774

=================================================================
Total params: 813,286
Trainable params: 813,286
Non-trainable params: 0
_________________________________________________________________
```

2. Accuracy:

In [28]:
```
model.fit_generator(x_train,
                    steps_per_epoch = 594/3 ,
                    epochs = 25,
                    validation_data = x_test,
                    validation_steps = 30/3 )
```

```
Epoch 1/25
C:\Users\Admin\AppData\Local\Temp\ipykernel_3112\3451504056.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
  model.fit_generator(x_train,
198/198 [==============================] - 8s 35ms/step - loss: 1.3777 - accuracy: 0.4646 - val_loss: 0.6199 - val_accuracy: 0.7333
Epoch 2/25
198/198 [==============================] - 7s 33ms/step - loss: 0.6012 - accuracy: 0.7660 - val_loss: 0.3735 - val_accuracy: 0.9000
Epoch 3/25
198/198 [==============================] - 7s 37ms/step - loss: 0.4252 - accuracy: 0.8451 - val_loss: 0.2633 - val_accuracy: 0.9333
Epoch 4/25
198/198 [==============================] - 7s 33ms/step - loss: 0.2835 - accuracy: 0.9040 - val_loss: 0.3102 - val_accuracy: 0.9000
Epoch 5/25
198/198 [==============================] - 7s 35ms/step - loss: 0.2265 - accuracy: 0.9175 - val_loss: 0.2665 - val_accuracy: 0.8667
Epoch 6/25
198/198 [==============================] - 6s 32ms/step - loss: 0.1848 - accuracy: 0.9293 - val_loss: 0.1487 - val_accuracy: 0.9667
Epoch 7/25
198/198 [==============================] - 6s 32ms/step - loss: 0.1545 - accuracy: 0.9377 - val_loss: 0.1618 - val_accuracy: 0.9667
Epoch 8/25
198/198 [==============================] - 7s 33ms/step - loss: 0.0952 - accuracy: 0.9714 - val_loss: 0.1758 - val_accuracy: 0.9333
Epoch 9/25
198/198 [==============================] - 7s 34ms/step - loss: 0.1694 - accuracy: 0.9478 - val_loss: 0.4433 - val_accuracy: 0.8000
Epoch 10/25
198/198 [==============================] - 6s 32ms/step - loss: 0.0689 - accuracy: 0.9764 - val_loss: 0.2010 - val_accuracy: 0.9667
Epoch 11/25
198/198 [==============================] - 7s 34ms/step - loss: 0.0850 - accuracy: 0.9714 - val_loss: 0.2113 - val_accuracy: 0.9000
Epoch 12/25
198/198 [==============================] - 6s 31ms/step - loss: 0.0568 - accuracy: 0.9798 - val_loss: 0.2163 - val_accuracy: 0.9667
Epoch 13/25
198/198 [==============================] - 6s 32ms/step - loss: 0.0447 - accuracy: 0.9815 - val_loss: 0.1506 - val_accuracy: 0.9000
Epoch 14/25
198/198 [==============================] - 6s 31ms/step - loss: 0.0535 - accuracy: 0.9815 - val_loss: 0.1665 - val_accuracy: 0.9667
Epoch 15/25
198/198 [==============================] - 6s 32ms/step - loss: 0.0989 - accuracy: 0.9630 - val_loss: 0.2479 - val_accuracy: 0.9333
Epoch 16/25
198/198 [==============================] - 7s 33ms/step - loss: 0.0454 - accuracy: 0.9798 - val_loss: 0.2539 - val_accuracy: 0.9333
Epoch 17/25
198/198 [==============================] - 6s 32ms/step - loss: 0.0222 - accuracy: 0.9949 - val_loss: 0.2553 - val_accuracy: 0.9333
Epoch 18/25
198/198 [==============================] - 10s 48ms/step - loss: 0.0292 - accuracy: 0.9949 - val_loss: 0.1708 - val_accuracy: 0.9333
Epoch 19/25
198/198 [==============================] - 8s 42ms/step - loss: 0.0060 - accuracy: 0.9983 - val_loss: 0.1921 - val_accuracy: 0.9667
Epoch 20/25
198/198 [==============================] - 6s 32ms/step - loss: 0.0390 - accuracy: 0.9848 - val_loss: 0.2202 - val_accuracy: 0.9667
Epoch 21/25
198/198 [==============================] - 7s 36ms/step - loss: 0.0614 - accuracy: 0.9747 - val_loss: 0.0367 - val_accuracy: 1.0000
Epoch 22/25
198/198 [==============================] - 7s 38ms/step - loss: 0.0658 - accuracy: 0.9764 - val_loss: 0.2446 - val_accuracy: 0.9333
Epoch 23/25
198/198 [==============================] - 7s 34ms/step - loss: 0.0166 - accuracy: 0.9949 - val_loss: 0.0201 - val_accuracy: 1.0000
Epoch 24/25
198/198 [==============================] - 7s 37ms/step - loss: 0.0427 - accuracy: 0.9882 - val_loss: 0.0123 - val_accuracy: 1.0000
Epoch 25/25
```