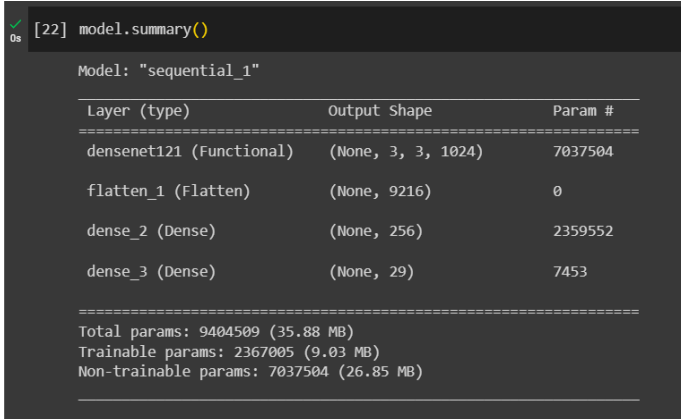
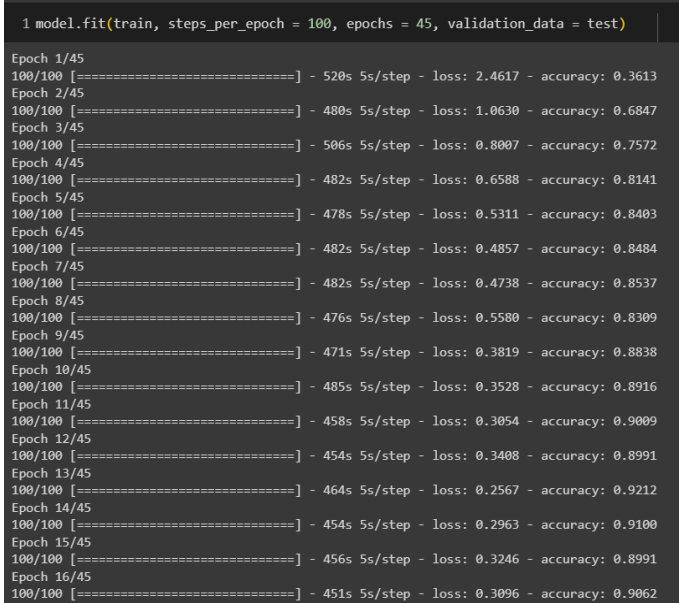


## Project Development Phase Model Performance Test

Date	21st November 2022
Team ID	Team - 591979
Project Name	ASL - Alphabet Image Recognition
Maximum Marks	10 Marks
Team members	Pujyam Sathvika, Rishika Krishna Ch

### Model Performance Testing:

S. No.	Parameter	Values	Screenshot
1.	Model Summary	Total params: 9404509 Trainable params: 2367005 Non-trainable params: 7037504	 <pre> [22] model.summary()  Model: "sequential_1" _____ Layer (type)                 Output Shape              Param # ----- densenet121 (Functional)     (None, 3, 3, 1024)       7037504 flatten_1 (Flatten)          (None, 9216)              0 dense_2 (Dense)               (None, 256)               2359552 dense_3 (Dense)              (None, 29)                7453 ----- Total params: 9404509 (35.88 MB) Trainable params: 2367005 (9.03 MB) Non-trainable params: 7037504 (26.85 MB) </pre>
2.	Accuracy	Final training accuracy – 0.9581	 <pre> 1 model.fit(train, steps_per_epoch = 100, epochs = 45, validation_data = test)  Epoch 1/45 100/100 [=====] - 520s 5s/step - loss: 2.4617 - accuracy: 0.3613 Epoch 2/45 100/100 [=====] - 480s 5s/step - loss: 1.0630 - accuracy: 0.6847 Epoch 3/45 100/100 [=====] - 506s 5s/step - loss: 0.8007 - accuracy: 0.7572 Epoch 4/45 100/100 [=====] - 482s 5s/step - loss: 0.6588 - accuracy: 0.8141 Epoch 5/45 100/100 [=====] - 478s 5s/step - loss: 0.5311 - accuracy: 0.8403 Epoch 6/45 100/100 [=====] - 482s 5s/step - loss: 0.4857 - accuracy: 0.8484 Epoch 7/45 100/100 [=====] - 482s 5s/step - loss: 0.4738 - accuracy: 0.8537 Epoch 8/45 100/100 [=====] - 476s 5s/step - loss: 0.5580 - accuracy: 0.8309 Epoch 9/45 100/100 [=====] - 471s 5s/step - loss: 0.3819 - accuracy: 0.8838 Epoch 10/45 100/100 [=====] - 485s 5s/step - loss: 0.3528 - accuracy: 0.8916 Epoch 11/45 100/100 [=====] - 458s 5s/step - loss: 0.3054 - accuracy: 0.9009 Epoch 12/45 100/100 [=====] - 454s 5s/step - loss: 0.3408 - accuracy: 0.8991 Epoch 13/45 100/100 [=====] - 464s 5s/step - loss: 0.2567 - accuracy: 0.9212 Epoch 14/45 100/100 [=====] - 454s 5s/step - loss: 0.2963 - accuracy: 0.9100 Epoch 15/45 100/100 [=====] - 456s 5s/step - loss: 0.3246 - accuracy: 0.8991 Epoch 16/45 100/100 [=====] - 451s 5s/step - loss: 0.3096 - accuracy: 0.9062 </pre>

## Screenshots:

### Model Summary:

```
✓ [22] model.summary()
0s

Model: "sequential_1"

Layer (type)                 Output Shape              Param #
=====
densenet121 (Functional)     (None, 3, 3, 1024)       7037504
flatten_1 (Flatten)          (None, 9216)              0
dense_2 (Dense)               (None, 256)              2359552
dense_3 (Dense)               (None, 29)               7453
=====
Total params: 9404509 (35.88 MB)
Trainable params: 2367005 (9.03 MB)
Non-trainable params: 7037504 (26.85 MB)
=====
```

### Training accuracy:

```
1 model.fit(train, steps_per_epoch = 100, epochs = 45, validation_data = test)

Epoch 1/45
100/100 [=====] - 520s 5s/step - loss: 2.4617 - accuracy: 0.3613
Epoch 2/45
100/100 [=====] - 480s 5s/step - loss: 1.0630 - accuracy: 0.6847
Epoch 3/45
100/100 [=====] - 506s 5s/step - loss: 0.8007 - accuracy: 0.7572
Epoch 4/45
100/100 [=====] - 482s 5s/step - loss: 0.6588 - accuracy: 0.8141
Epoch 5/45
100/100 [=====] - 478s 5s/step - loss: 0.5311 - accuracy: 0.8403
Epoch 6/45
100/100 [=====] - 482s 5s/step - loss: 0.4857 - accuracy: 0.8484
Epoch 7/45
100/100 [=====] - 482s 5s/step - loss: 0.4738 - accuracy: 0.8537
Epoch 8/45
100/100 [=====] - 476s 5s/step - loss: 0.5580 - accuracy: 0.8309
Epoch 9/45
100/100 [=====] - 471s 5s/step - loss: 0.3819 - accuracy: 0.8838
Epoch 10/45
100/100 [=====] - 485s 5s/step - loss: 0.3528 - accuracy: 0.8916
Epoch 11/45
100/100 [=====] - 458s 5s/step - loss: 0.3054 - accuracy: 0.9009
Epoch 12/45
100/100 [=====] - 454s 5s/step - loss: 0.3408 - accuracy: 0.8991
Epoch 13/45
100/100 [=====] - 464s 5s/step - loss: 0.2567 - accuracy: 0.9212
Epoch 14/45
100/100 [=====] - 454s 5s/step - loss: 0.2963 - accuracy: 0.9100
Epoch 15/45
100/100 [=====] - 456s 5s/step - loss: 0.3246 - accuracy: 0.8991
Epoch 16/45
100/100 [=====] - 451s 5s/step - loss: 0.3096 - accuracy: 0.9062
```

```
model.fit(train, steps_per_epoch = 100, epochs = 45, validation_data = test)
```

```
Epoch 16/45
100/100 [=====] - 451s 5s/step - loss: 0.3096 - accuracy: 0.9062
Epoch 17/45
100/100 [=====] - 460s 5s/step - loss: 0.2730 - accuracy: 0.9216
Epoch 18/45
100/100 [=====] - 463s 5s/step - loss: 0.2688 - accuracy: 0.9228
Epoch 19/45
100/100 [=====] - 463s 5s/step - loss: 0.2482 - accuracy: 0.9222
Epoch 20/45
100/100 [=====] - 469s 5s/step - loss: 0.3183 - accuracy: 0.8988
Epoch 21/45
100/100 [=====] - 475s 5s/step - loss: 0.2512 - accuracy: 0.9237
Epoch 22/45
100/100 [=====] - 455s 5s/step - loss: 0.2507 - accuracy: 0.9303
Epoch 23/45
100/100 [=====] - 460s 5s/step - loss: 0.2350 - accuracy: 0.9319
Epoch 24/45
100/100 [=====] - 458s 5s/step - loss: 0.2460 - accuracy: 0.9231
Epoch 25/45
100/100 [=====] - 469s 5s/step - loss: 0.1844 - accuracy: 0.9375
Epoch 26/45
100/100 [=====] - 460s 5s/step - loss: 0.2047 - accuracy: 0.9319
Epoch 27/45
100/100 [=====] - 461s 5s/step - loss: 0.2295 - accuracy: 0.9316
Epoch 28/45
100/100 [=====] - 466s 5s/step - loss: 0.2013 - accuracy: 0.9378
Epoch 29/45
100/100 [=====] - 460s 5s/step - loss: 0.2113 - accuracy: 0.9362
Epoch 30/45
100/100 [=====] - 457s 5s/step - loss: 0.2060 - accuracy: 0.9428
Epoch 31/45
100/100 [=====] - 449s 4s/step - loss: 0.2795 - accuracy: 0.9234
Epoch 32/45
```

```
Epoch 32/45
100/100 [=====] - 454s 5s/step - loss: 0.1805 - accuracy: 0.9463
Epoch 33/45
100/100 [=====] - 448s 4s/step - loss: 0.1723 - accuracy: 0.9466
Epoch 34/45
100/100 [=====] - 449s 4s/step - loss: 0.2085 - accuracy: 0.9438
Epoch 35/45
100/100 [=====] - 450s 4s/step - loss: 0.2956 - accuracy: 0.9187
Epoch 36/45
100/100 [=====] - 452s 5s/step - loss: 0.2136 - accuracy: 0.9337
Epoch 37/45
100/100 [=====] - 452s 5s/step - loss: 0.1503 - accuracy: 0.9534
Epoch 38/45
100/100 [=====] - 449s 4s/step - loss: 0.1458 - accuracy: 0.9534
Epoch 39/45
100/100 [=====] - 447s 4s/step - loss: 0.2150 - accuracy: 0.9394
Epoch 40/45
100/100 [=====] - 448s 4s/step - loss: 0.1792 - accuracy: 0.9475
Epoch 41/45
100/100 [=====] - 452s 5s/step - loss: 0.1736 - accuracy: 0.9513
Epoch 42/45
100/100 [=====] - 452s 5s/step - loss: 0.1575 - accuracy: 0.9528
Epoch 43/45
100/100 [=====] - 453s 5s/step - loss: 0.2216 - accuracy: 0.9406
Epoch 44/45
100/100 [=====] - 447s 4s/step - loss: 0.2127 - accuracy: 0.9378
Epoch 45/45
100/100 [=====] - 467s 5s/step - loss: 0.1417 - accuracy: 0.9581
<keras.src.callbacks.History at 0x7bf973e20880>
```