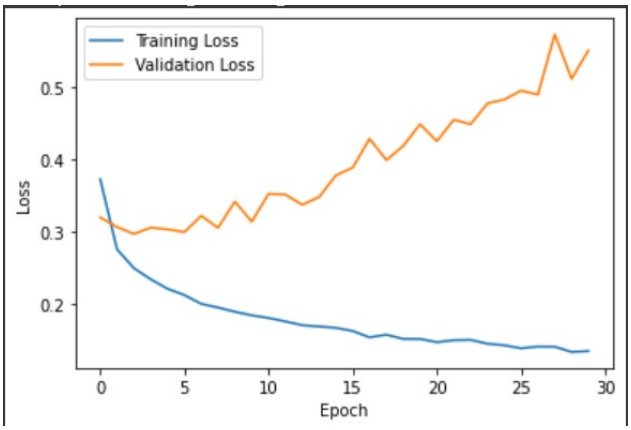
Model Architecture

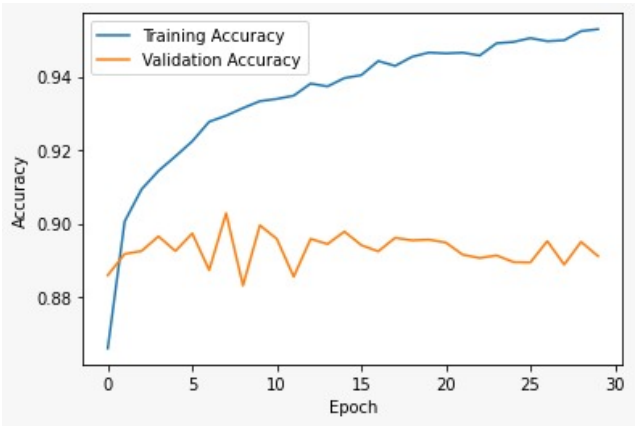
For every model :-

- Learning rate = 0.005
- Batch size = 32
- Epochs = 30

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 28, 28, 32)        320

 max_pooling2d (MaxPooling2D  (None, 14, 14, 32)       0
 )

 conv2d_1 (Conv2D)           (None, 14, 14, 64)        18496

 max_pooling2d_1 (MaxPooling  (None, 7, 7, 64)         0
 2D)

 flatten (Flatten)           (None, 3136)              0

 dense (Dense)               (None, 10)                31370

=================================================================
Total params: 50,186
Trainable params: 50,186
Non-trainable params: 0
_________________________________________________________________
```

Accuracy vs Epochs and Loss vs Epochs

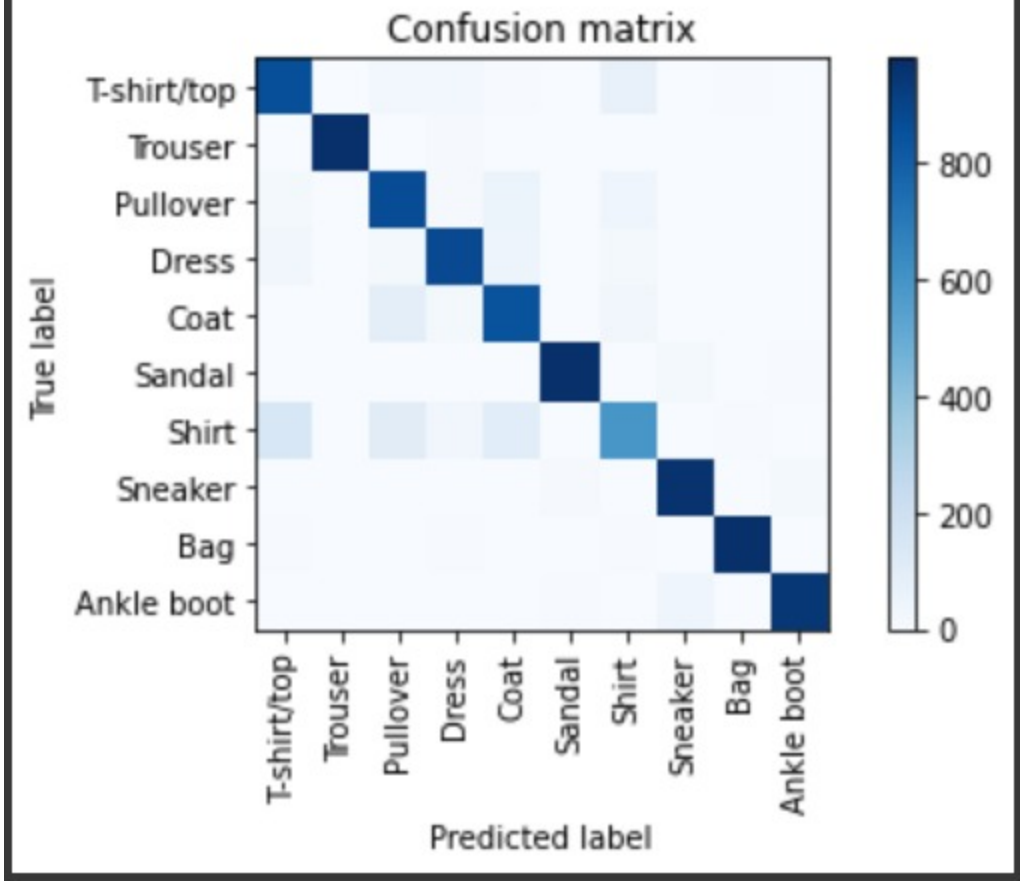




Confusion Matrix

```
Confusion matrix:
 [[863   0  23  24   7   2  75   0   6   0]
 [  1 981   2  10   3   0   2   0   1   0]
 [ 18   1 872   8  59   0  42   0   0   0]
 [ 31   2  17 882  46   0  18   0   3   1]
 [  3   1  98  19 848   0  31   0   0   0]
 [  0   0   0   0   1 975   0  17   0   7]
 [151   1 109  33 107   0 592   0   7   0]
 [  0   0   0   0   0   9   0 968   1  22]
 [  4   0   3   7   3   1   4   1 977   0]
 [  0   0   0   0   0   6   0  40   1 953]]
```

```
Plotting confusion matrix
```



Classification Report

	precision	recall	f1-score	support
0	0.81	0.86	0.83	1000
1	0.99	0.98	0.99	1000
2	0.78	0.87	0.82	1000
3	0.90	0.88	0.89	1000
4	0.79	0.85	0.82	1000
5	0.98	0.97	0.98	1000
6	0.77	0.59	0.67	1000
7	0.94	0.97	0.96	1000
8	0.98	0.98	0.98	1000
9	0.97	0.95	0.96	1000
accuracy			0.89	10000
macro avg	0.89	0.89	0.89	10000
weighted avg	0.89	0.89	0.89	10000

It achieved a good accuracy of 89.11% on the validation set.
The training accuracy was 95.29% which shows that it did not overfit.