

# Experiments Report

## First Neural Network architecture :

Layer (type)	Output Shape	Param #
dense_40 (Dense)	(None, 2048)	8390656
dense_41 (Dense)	(None, 1024)	2098176
dense_42 (Dense)	(None, 10)	10250
Total params: 10,499,082		
Trainable params: 10,499,082		
Non-trainable params: 0		

### First split :

Accuracy = 0.49166667461395264

### Second split :

Accuracy = 0.6349999904632568

### Third split :

Accuracy = 0.699999988079071

## Evaluating :

	precision	recall	f1-score	support
0	0.78	0.90	0.84	68
1	0.84	0.64	0.72	66
2	0.53	0.86	0.65	49
3	0.68	0.92	0.78	48
4	0.73	0.46	0.57	71
5	0.78	0.91	0.84	66
6	0.65	0.90	0.76	61
7	0.92	0.18	0.30	68
8	0.53	0.66	0.59	44
9	0.79	0.71	0.75	59
accuracy			0.70	600
macro avg	0.72	0.71	0.68	600
weighted avg	0.74	0.70	0.68	600

## Second Neural Network architecture :

Layer (type)	Output Shape	Param #
=====		
dense_30 (Dense)	(None, 100)	409700
dense_31 (Dense)	(None, 400)	40400
dense_32 (Dense)	(None, 300)	120300
dense_33 (Dense)	(None, 10)	3010
=====		
Total params: 573,410		
Trainable params: 573,410		
Non-trainable params: 0		

### First split :

Accuracy = 0.39500001072883606

### Second split :

Accuracy = 0.6050000190734863

### Third split :

Accuracy = 0.621666669845581

### Evaluating :

	precision	recall	f1-score	support
0	0.52	0.94	0.67	66
1	0.89	0.64	0.74	50
2	0.93	0.22	0.35	65
3	0.95	0.66	0.78	56
4	0.48	0.50	0.49	68
5	0.79	0.91	0.85	70
6	0.45	0.33	0.38	64
7	0.62	0.53	0.57	59
8	0.47	0.60	0.53	48
9	0.61	0.91	0.73	54
accuracy			0.62	600
macro avg	0.67	0.62	0.61	600
weighted avg	0.67	0.62	0.60	600

## CNN architecture :

Layer (type)	Output Shape	Param #
=====		
conv2d_5 (Conv2D)	(None, 61, 61, 64)	3136
max_pooling2d_5 (MaxPooling2D)	(None, 30, 30, 64)	0
flatten_5 (Flatten)	(None, 57600)	0
dense_28 (Dense)	(None, 64)	3686464
dense_29 (Dense)	(None, 10)	650
=====		
Total params: 3,690,250		
Trainable params: 3,690,250		
Non-trainable params: 0		

### First split :

Accuracy = 0.7599999904632568

### Second split :

Accuracy = 0.8566666841506958

### Third split :

Accuracy = 0.9049999713897705

## Evaluating :

	precision	recall	f1-score	support
0	0.93	0.97	0.95	59
1	0.86	1.00	0.93	63
2	0.96	0.69	0.80	65
3	0.96	0.93	0.95	58
4	0.98	0.84	0.90	67
5	0.96	1.00	0.98	68
6	0.81	0.91	0.86	53
7	0.77	0.93	0.84	58
8	0.89	0.88	0.88	57
9	0.96	0.92	0.94	52
accuracy			0.91	600
macro avg	0.91	0.91	0.90	600
weighted avg	0.91	0.91	0.90	600

## SVM Evaluating :

	precision	recall	f1-score	support
0	0.93	0.98	0.95	52
1	0.93	0.87	0.90	47
2	0.84	0.89	0.86	46
3	1.00	0.82	0.90	50
4	0.76	0.72	0.74	43
5	0.92	0.97	0.94	59
6	0.75	0.93	0.83	41
7	0.77	0.66	0.71	41
8	0.73	0.77	0.75	35
9	0.89	0.86	0.88	37
accuracy			0.86	451
macro avg	0.85	0.85	0.85	451
weighted avg	0.86	0.86	0.86	451

## Comparing between models (NN vs SVM):

Model	ANN1	ANN2	CNN(using RGB image )	SVM(using RGB image )
Accuracy	70 %	62%	91%	86%