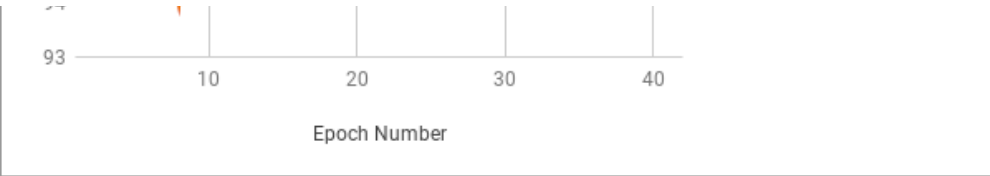**Experiment 1 Results**

Letter : A **Hidden Units: 4** **Learning Rate: 0.0625** **Momentum: 0.05**

Training Run	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Accuracy	Max Epoch	Desired Accuracy	Overfitting
1	18	99.0333	98.8501	99	0	1	0
2	22	98.7667	98.925	99.0825	0	1	0
3	15	98.5083	98.625	99.0245	0	1	0
4	23	98.775	98.925	99	0	1	0
5	23	99.1	99.2	98.95	1	0	0
6	40	98.8583	98.7	99	0	1	0
7	33	98.8	98.675	99	0	1	0
8	77	98.95	98.625	99.05	0	1	0
9	21	99.15	98.775	99	0	1	0
10	79	99.0083	98.9	99	0	1	0
	35.1	98.89499	98.82001	99.0107	1	9	0

Hidden Unit	Avg. Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Acuracy	Max Epoch	Desired Accuracy	Overfitting
8	61.4	98.90831	98.9475	98.96	3	7	0
4	38.4	98.89499	98.82001	99.0107	1	9	0
12	50.4	98.87247	98.9125	98.9925	1	9	0

Epoch Number	Training Accuracy	Validation Accuracy	Generalization Accuracy
1	95.975	96	96.35
2	95.975	96	96.35
3	95.975	96	96.35
4	95.975	96	96.35
5	95.975	96	96.35
6	95.975	96	96.35
7	95.975	95.8	96.125
8	95.2333	93.975	94.05
9	95.0417	96.3	95.8999
10	96.3917	97.575	97.3999
11	97.475	98	97.8999
12	98.0333	98.35	98.05

Training Accuracy, Validation Accuracy and Generalization Accuracy

13	98.3166	98.475	98.25
14	98.4916	98.55	98.3
15	98.5249	98.6	98.5249
16	98.6083	98.7	98.575
17	98.6417	98.7	98.65
18	98.6833	98.7	98.675
19	98.7083	98.725	98.7
20	98.7416	98.775	98.8
21	98.775	98.8	98.85
22	98.7916	98.825	98.85
23	98.8	98.85	98.85
24	98.8166	98.875	98.9
25	98.8416	98.875	98.9
26	98.8416	98.9	98.9
27	98.8583	98.9	98.9
28	98.875	98.975	98.9
29	98.875	98.975	98.925
30	98.9	99.0249	98.9
31	98.9083	99.075	98.9
32	98.9166	99.1	98.9
33	98.9333	99.15	98.925
34	98.925	99.15	98.925
35	98.9333	99.175	98.95
36	98.9416	99.175	98.95
37	98.9333	99.175	98.95
38	98.925	99.175	98.95
39	98.925	99.175	98.95
40	98.9416	99.175	98.95
41	98.9416	99.175	98.95
42	98.9416	99.175	99

93

10   20   30   40

Epoch Number

Experiment 1 Results

Letter : V		Hidden Units: 8		Learning Rate: 0.5 / 0.5		Momentum: 0.05	
Training Run	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Accuracy	Max Epoch	Desired Accuracy	Overfitting
1	54	99.1667	99.075	99	0	1	0
2	49	99.05	99.25	99.05	0	1	0
3	45	98.975	99.05	99.025	0	1	0
4	100	99.375	98.8	98.875	1	0	0
5	71	99.2416	99.15	99.025	0	1	0
6	61	99.1916	99	99	0	1	0
7	100	99.325	99.025	98.85	1	0	0
8	87	99.2083	99.4	99	0	1	0
9	51	99.2167	99.05	99	0	1	0
10	45	99.0584	98.75	99	0	1	0
	66.3	99.18083	99.055	98.9825	2	8	0

Learning Rate	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Accuracy	Max Epoch	Desired Accuracy	Overfitting
1 / fanin	76.6	97.16298	96.885	96.7975	8	0	2
0.05	27.1	96.10497	96.02	95.9125	0	0	10
0.5	66.3	99.18083	99.055	98.9825	2	8	0

Experiment 1 Results

Letter : D		Hidden Units: 8		Learning Rate: 0.5 / 0.5		Momentum: 0.5	
Training Run	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization A	Max Epoch	Desired Accurac	Overfitting
1	100	97.7333	98.05	97.8999	1	0	0
2	100	98.1166	98.1	97.975	1	0	0
3	100	98.0544	97.5	96.85	1	0	0
4	100	97.8666	98.425	97.8	1	0	0
5	100	98.0167	97.55	97.2	1	0	0
6	100	98.25	97.95	98.05	1	0	0
7	100	97.7667	97.6	97.5	1	0	0
8	100	97.725	97.1	96.975	1	0	0
9	100	97.8999	97.45	98.125	1	0	0
10	100	97.575	98.075	97.7	1	0	0
	100	97.90042	97.78	97.60749	10	0	0

Epoch Number	Training Accuracy	Validation Accuracy	Generalization Accuracy
1	96.3333	96.05	96.15
2	96.325	96.05	96.125
3	95.9916	97	97.375
4	97.8166	98.075	98.45
5	98.4	98.45	98.675
6	98.6333	98.6	98.8
7	98.7333	98.675	98.85
8	98.8	98.725	98.9
9	98.8	98.85	99

Training Accuracy, Validation Accuracy and Generalization Accuracy
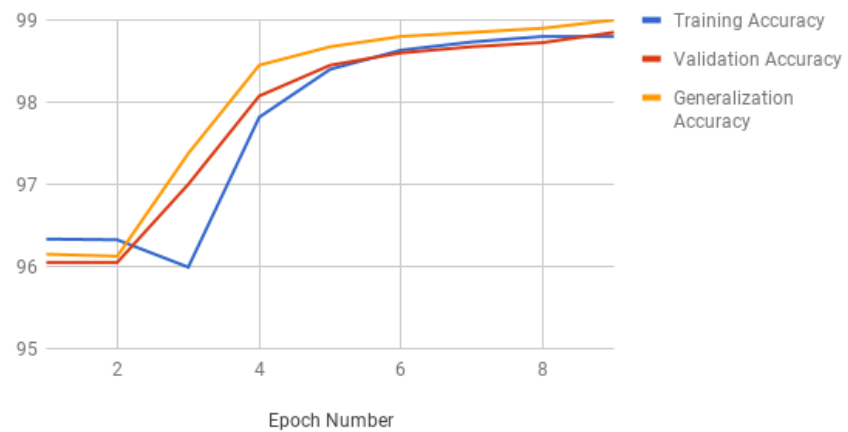
Experiment 2 Results

	Hidden Units: 12			Learning Rate: 0.5		Momentum: 0.05	
Training Run	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Accuracy	Max Epoch	Desired Accuracy	Overfitting
1	500	93.1166	91.1	91.525	1	0	0
2	500	93.9083	93.55	92.7	1	0	0
3	500	94.375	93.3	92.975	1	0	0
4	500	94.0833	93.175	93.325	1	0	0
5	500	93.6166	93	93.15	1	0	0
6	500	93.9916	93.8	93.05	1	0	0
7	500	93.3083	92.925	92.475	1	0	0
8	500	94.5916	94.225	93.8	1	0	0
	500	93.8739125	93.134375	92.875	8	0	0

Hidden Unit	Avg. Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Acuracy	Max Epoch	Desired Accuracy	Overfitting
4	500	87.00515	86.009375	85.5999875	8	0	0
8	500	89.7519625	90.159375	89.8812375	8	0	0
12	500	93.8739125	93.134375	92.875	8	0	0

Epoch Number	Training Accuracy	Validation Accuracy	Generalization Accuracy
1	75.4499	76.1499	76.6499
2	70.9916	75.05	75.1499
3	71.875	74.775	75.425
4	73.0083	75.175	74.4
5	74.0416	75.6	74.3
10	81.7083	84.325	83.65
25	85.8166	85.45	85.25
50	90.0333	90.375	89.85
75	91.4	91.35	90.425
100	92.0416	92.1	91.25
125	92.325	92.35	91.725
150	92.625	91.85	91.525
175	93.283	92.525	91.8
200	93.2583	91.875	91.45
225	93.3916	91.325	91
250	93.375	90.8	90.7
275	93.4416	92.675	92.15
300	93.625	91.85	91.975
325	93.6833	92	91.8

Training Accuracy, Validation Accuracy and Generalization Accuracy
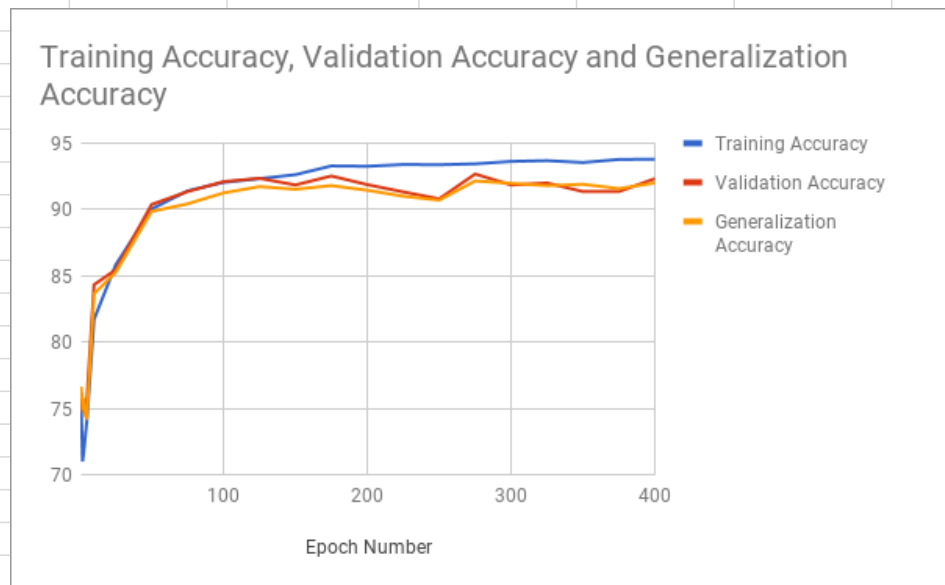
350	93.5416	91.35	91.9							
375	93.7749	91.35	91.5749							
400	93.7916	92.325	92							
425	98.6417	98.7	98.65							
450	98.6833	98.7	98.675							
475	98.7083	98.725	98.7							
500	98.7416	98.775	98.8							

Experiment 2 Results

		Hidden Units: 12		Learning Rate: 1/fanin		Momentum: 0.05	
Training Run	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Accuracy	Max Epoch	Desired Accuracy	Overfitting
1	500	90.7749	89.8	89.625	1	0	0
2	500	91.8083	91.925	91.9	1	0	0
3	500	91.9833	91.2	89.925	1	0	0
4	500	90.7166	89.925	89.05	1	0	0
5	500	91.0416	89.475	90.125	1	0	0
6	500	90.1	89.925	90.4	1	0	0
7	500	90.5166	90.35	89.8	1	0	0
8	500	90.1916	89.725	89.925	1	0	0
	500	90.8916125	90.290625	90.09375	8	0	0

Learning Rate	Avg. Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Acuracy	Max Epoch	Desired Accuracy	Overfitting
0.5	500	93.8739125	93.134375	92.875	8	0	0
0.05	500	90.627025	89.959375	89.68125	8	0	0

Experiment 2 Results

		Hidden Units: 12		Learning Rate: 0.5		Momentum: 0.5	
Training Run	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Accuracy	Max Epoch	Desired Accuracy	Overfitting
1	500	93.9833	92.5	92.2	1	0	0
2	500	93.4	91.6499	91.375	1	0	0
3	500	94.666	93.925	93.875	1	0	0
4	500	94.7916	93.4	92.9	1	0	0
5	500	93.4083	92.125	92.75	1	0	0
6	500	93.9333	93	93.025	1	0	0
7	500	94.3	93.75	93.675	1	0	0
8	500	94.1333	94.2749	93.825	1	0	0
	500	94.076975	93.0781	92.953125	8	0	0

Experiment 3 Results

		Hidden Units: 24		Learning Rate: 0.5		Momentum: 0.05	
Training Run	Epoch Reached	Training Accuracy	Validation Accuracy	Generalization Accuracy	Max Epoch	Desired Accuracy	Overfitting
1	1000	74.1666	70.425	69.325	1	0	0
2	1000	68.475	66.4	66.725	1	0	0
3	1000	70.2416	66.4	66.375	1	0	0
4	1000	70.1	66.025	66.375	1	0	0
5	1000	69.6583	66.2	65.3	1	0	0
	1000	70.5283	67.09	66.82	5	0	0

Epoch Number	Training Accuracy	Validation Accuracy	Generalization Accuracy
10	44.5916	42.4499	41.05
100	68.23333333	66.77499	66.2
200	70.39166	68.7	67.325
300	71.2	68.975	67.8
400	71.8	69.325	67.9
500	72.4083	68.6	67.85
600	73.00833	69.85	70.15
700	72.975	69.8	68.925
800	73.3916	69.175	68.65
900	74.05	70.5	69.875
1000	74.16666	70.425	69.325

Training Accuracy, Validation Accuracy and Generalization Accuracy