

# Machine Learning - hw2

## Mnist

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### Hyperparamters:

➤ mnist:

➤ Initial values:

- Image\_shape = (28,28,1)
- Num\_of\_classes = 10

Attempt	Batch size	epoch	Layer	type	neurons	Dropout	Regularization	activation	Accuracy
1	32	10	1	Dense	89	0	Batch normalization	relu	
			2	Dense	45	0	Batch normalization	relu	
			3	Dense	26	0	Batch normalization	relu	
			4	Dense	24	0.3	Batch normalization	relu	
				Dense	10	0	—	softmax	0.978
2	32	10	1	Dense	89	0.3	Batch normalization	relu	
			2	Dense	45	0.3	Batch normalization	relu	
			3	Dense	26	0.3	Batch normalization	relu	
			4	Dense	24	0.3	Batch normalization	relu	
				Dense	10	0	—	softmax	0.961
3	32	10	1	Dense	89	0	—	relu	
			2	Dense	45	0	—	relu	
			3	Dense	26	0	—	relu	
			4	Dense	24	0	—	relu	
				Dense	10	0	—	softmax	0.974

Attempt	Batch size	epoch	Layer	type	neurons	Dropout	Regularization	activation	Accuracy
4	32	10	1	Dense	89	0.3	Batch normalization	elu	
			2	Dense	45	0.3	Batch normalization	elu	
			3	Dense	26	0.3	Batch normalization	elu	
			4	Dense	24	0.3	Batch normalization	elu	
				Dense	10	0	—	softmax	0.967
5	32	10	1	Dense	89	0.3	Batch normalization	sigmoid	
			2	Dense	45	0.3	Batch normalization	sigmoid	
			3	Dense	26	0.3	Batch normalization	sigmoid	
			4	Dense	24	0.3	Batch normalization	sigmoid	
				Dense	10	0	—	softmax	0.958
6	32	10	1	Dense	89	0.3	Batch normalization	tanh	
			2	Dense	45	0.3	Batch normalization	tanh	
			3	Dense	26	0.3	Batch normalization	tanh	
			4	Dense	24	0.3	Batch normalization	tanh	
				Dense	10	0	—	softmax	0.962

Attempt	Batch size	epoch	Layer	type	neurons	Dropout	Regularization	activation	Accuracy
7	32	10	1	Dense	89	0.3	L2	relu	
			2	Dense	45	0.3	L2	relu	
			3	Dense	26	0.3	L2	relu	
			4	Dense	24	0.3	L2	relu	
				Dense	10	0	—	softmax	0.920
8	32	10	1	Dense	89	0.3	L1	relu	
			2	Dense	45	0.3	L1	relu	
			3	Dense	26	0.3	L1	relu	
			4	Dense	24	0.3	L1	relu	
				Dense	10	0	—	softmax	0.1135
9	32	10	1	Dense	89	0.1	Batch normalization	relu	
			2	Dense	45	0.1	Batch normalization	relu	
			3	Dense	26	0.1	Batch normalization	relu	
			4	Dense	24	0.1	Batch normalization	relu	
				Dense	10	0	—	softmax	0.972

Attempt	Batch size	epoch	Layer	type	neurons	Dropout	Regularization	activation	Accuracy
10	128	10	1	Dense	89	0.1	Batch normalization	relu	
			2	Dense	45	0.1	Batch normalization	relu	
			3	Dense	26	0.1	Batch normalization	relu	
			4	Dense	24	0.1	Batch normalization	relu	
				Dense	10	0	—	softmax	0.974
11	64	10	1	Dense	89	0.3	Batch normalization	relu	
			2	Dense	45	0.3	Batch normalization	relu	
			3	Dense	26	0.3	Batch normalization	relu	
			4	Dense	24	0.3	Batch normalization	relu	
				Dense	10	0	—	softmax	0.973
12	32	10	1	Dense	89	0.3	Batch normalization	relu	
			2	Dense	45	0.2	Batch normalization	relu	
			3	Dense	26	0.1	Batch normalization	relu	
			4	Dense	24	0	Batch normalization	relu	
				Dense	10	0	—	softmax	0.970

Attempt	Batch size	epoch	Layer	type	neurons	Dropout	Regularization	activation	Accuracy
13	32	10	1	Dense	89	0.1	Batch normalization	relu	
			2	Dense	45	0	Batch normalization	relu	
			3	Dense	26	0.1	Batch normalization	relu	
			4	Dense	24	0	Batch normalization	relu	
				Dense	10	0	—	softmax	0.977
14	64	10	1	Dense	89	0.1	Batch normalization	relu	
			2	Dense	45	0	Batch normalization	elu	
			3	Dense	26	0.1	Batch normalization	relu	
			4	Dense	24	0	Batch normalization	elu	
				Dense	10	0	—	softmax	0.975
15	32	10	1	Dense	89	0.3	Batch normalization	relu	
			2	Dense	45	0	Batch normalization	elu	
			3	Dense	26	0.3	Batch normalization	relu	
			4	Dense	24	0	Batch normalization	elu	
				Dense	10	0	—	softmax	0.970