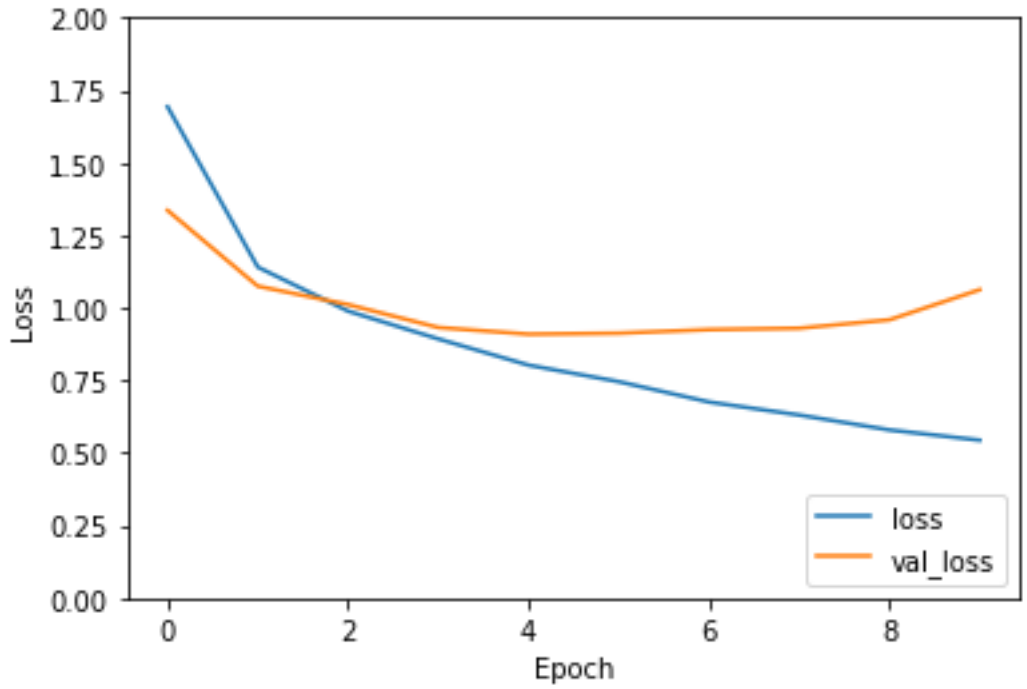
CNN: part 0 – 1 – 2

Main model:

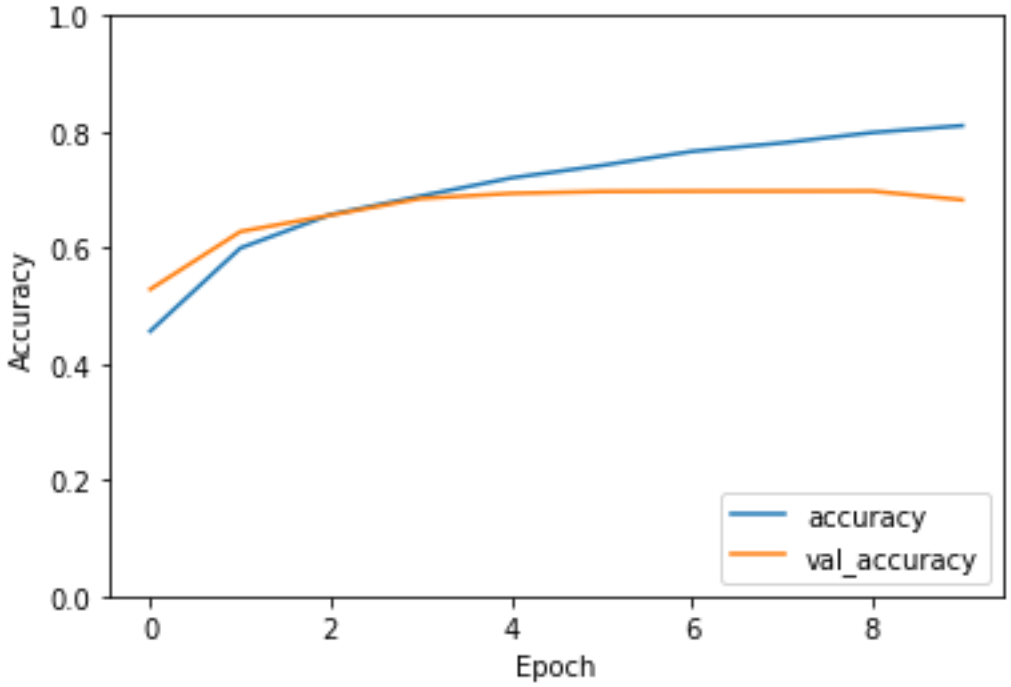
Layer	Type	Input Size	Kernel Size	# Filters	Nonlinearity	Pooling	Stride	Output Size	Parameters
1	Conv	(32, 32, 3)	3*3	32	Relu	average	1	(32, 32, 32)	896
2	Max Pooling	(32, 32, 32)	2*2					(16, 16, 32)	0
3	Conv	(16, 16, 32)	3*3	64	Relu	average	1	(16, 16, 64)	18496
4	Max Pooling	(16, 16, 64)	2*2					(8, 8, 64)	0
5	Conv	(8, 8, 64)	3*3	128	Relu	average	1	(8, 8, 128)	73856
6	Max Pooling	(8, 8, 128)	2*2					(4, 4, 128)	0
7	Flatten	(4, 4, 128)						(2048)	0
8	Dense	(2048)		128	Relu			(128)	262272
9	Dense	(128)		10	softmax			(10)	1290

Total parameters: 356810

Training and test losses vs. training iterations:



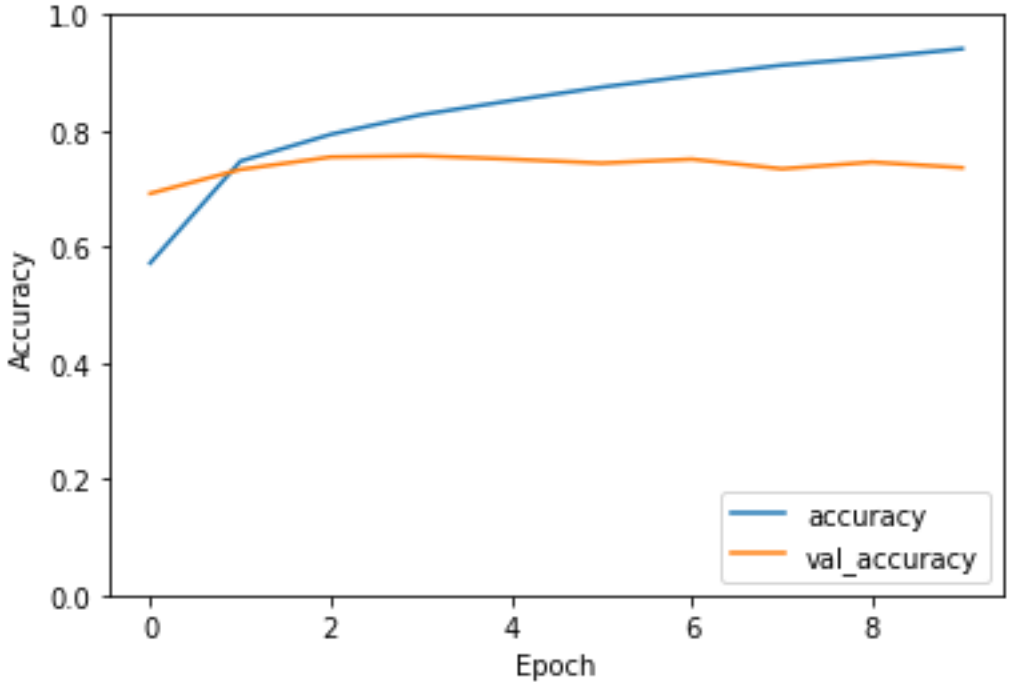
Classification accuracy on the test set vs. training iterations:



Mean time for each epoch = 15 – 16

Model with GCN: part 3

Classification accuracy on the test set vs. training iterations:



Mean time for each epoch = 16 – 17

The network train slower a bit that can be ignored

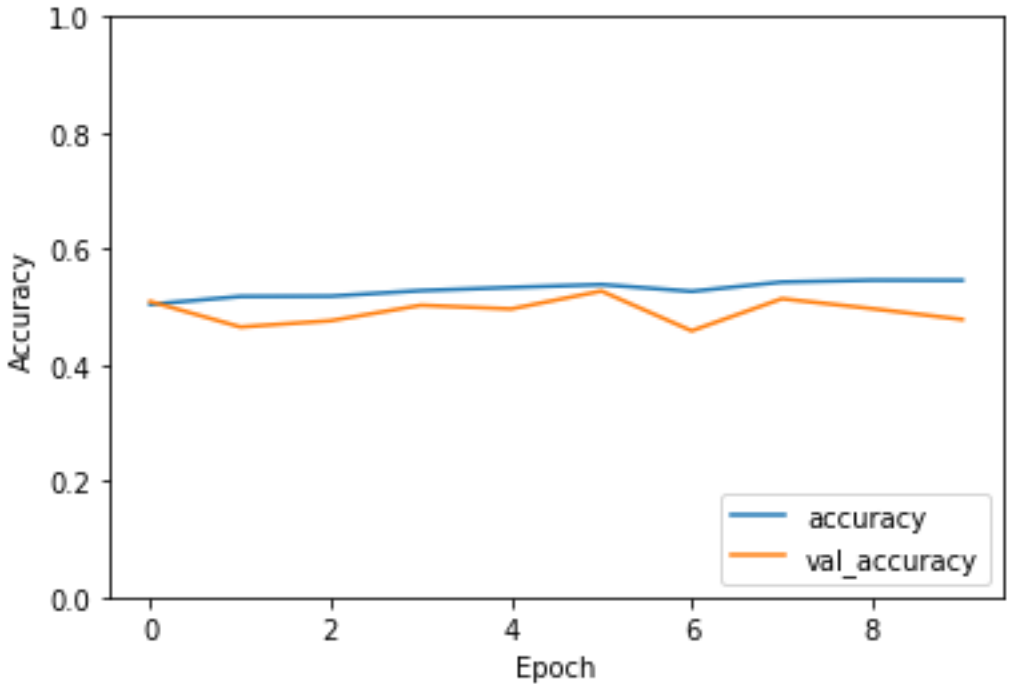
Generalize better because the accuracy has been increased significantly

Model with only one hidden convolutional layer and same parameters: part 4

Layer	Type	Input Size	Kernel Size	# Filters	Nonlinearity	Pooling	Stride	Output Size	Parameters
1	Conv	(32, 32, 3)	3*3	512	Relu	average	1	(32, 32, 512)	14336
2	Max Pooling	(32, 32, 512)	4*4					(8, 8, 512)	0
3	Flatten	(8, 8, 512)						(32768)	0
4	Dense	(32768)		10	softmax			(10)	327690

Total parameters: 342026

Classification accuracy on the test set vs. training iterations:



Accuracy has been decreased significantly

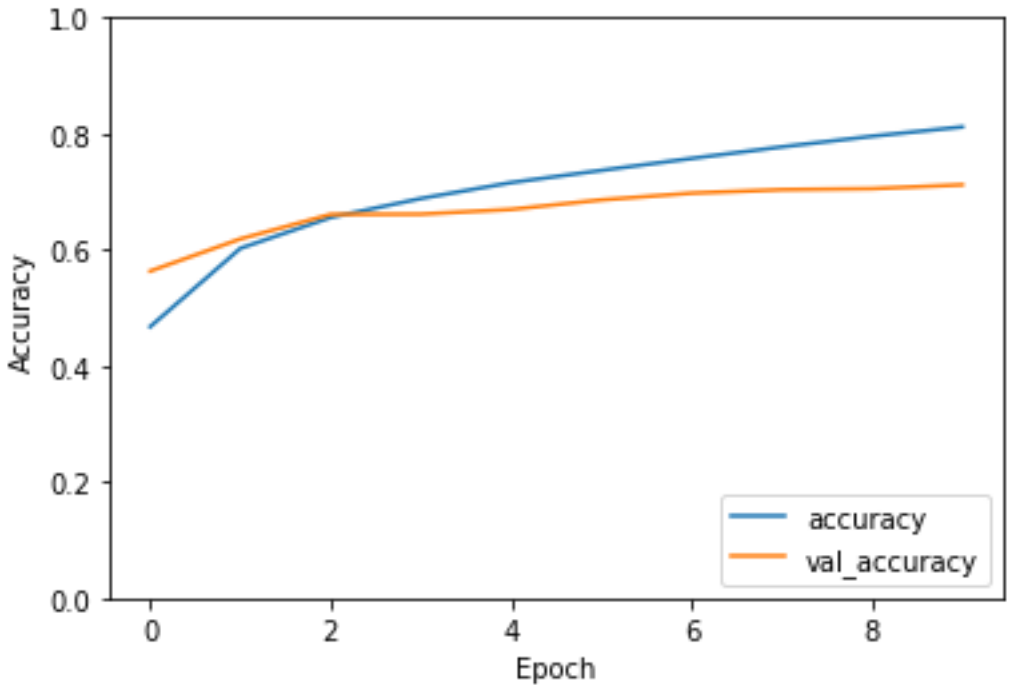
Model with only one hidden convolutional layer and same parameters: part 4

Layer	Type	Input Size	Kernel Size	# Filters	Nonlinearity	Pooling	Stride	Output Size	Parameters

1	Conv	(32, 32, 3)	3*3	32	Relu	average	1	(32, 32, 32)	896
2	Max Pooling	(32, 32, 32)	2*2					(16, 16, 32)	0
3	Conv	(16, 16, 32)	3*3	64	Relu	average	1	(16, 16, 64)	18496
4	Max Pooling	(16, 16, 64)	2*2					(8, 8, 64)	0
5	Conv	(8, 8, 64)	4*4	128	Relu	average	1	(8, 8, 128)	131200
6	Max Pooling	(8, 8, 128)	2*2					(4, 4, 128)	0
7	Conv	(4, 4, 128)	3*3	128	Relu	average	1	(4, 4, 128)	147584
8	Max Pooling	(4, 4, 128)	2*2					(2, 2, 128)	0
9	Flatten	(2, 2, 128)						(512)	0
10	Dense	(512)		128	Relu			(128)	65664
11	Dense	(128)		10	softmax			(10)	1290

Total parameters: 365130

Classification accuracy on the test set vs. training iterations:



Accuracy has been increased significantly

Yes. Depth I important. And when the depth has been increased with the same parameters, we give better accuracy but the time of iteration has been increased a bit.