Convolutional Neural Network Architecture

Loss at Epoch from Early Stopping Callback: Single-label Output

Num of Filters	128		128			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 21/30
250/250 [==============================] - 233s - loss: 0.4677 - acc: 0.7271 - val_loss: 0.4272 - val_acc: 0.7264
Test loss: 4.9933286047
Test accuracy 0.66375
Total params: 5,063,428
Trainable params: 5,063,428
Non-trainable params: 0

Num of Filters	128		250			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	same		same							
activation	relu		relu			relu		relu		softmax

Epoch 30/30
250/250 [==============================] - 248s - loss: 0.4430 - acc: 0.7479 - val_loss: 0.4323 - val_acc: 0.7445
Test loss: 4.93330636978
Test accuracy 0.659375
Total params: 9,623,422
Trainable params: 9,623,422
Non-trainable params: 0

Num of Filters	128		256			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 26/30
250/250 [==============================] - 231s - loss: 0.4266 - acc: 0.7533 - val_loss: 0.4128 - val_acc: 0.7457
Test loss: 4.32757368922
Test accuracy 0.68
Total params: 7,881,604
Trainable params: 7,881,604
Non-trainable params: 0

Num of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 18/30
250/250 [==============================] - 229s - loss: 0.4214 - acc: 0.7586 - val_loss: 0.4059 - val_acc: 0.7485
Test loss: 5.06435893536
Test accuracy 0.660625

Total params: 7,618,948

Convolutional Neural Network Architecture

Loss at Epoch from Early Stopping Callback: Single-label Output

Trainable params: 7,618,948
Non-trainable params: 0
adamax = Adamax(lr=0.003, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Num of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 23/30
250/250 [==============================] - 241s - loss: 0.3806 - acc: 0.7873 - val_loss: 0.3871 - val_acc: 0.7597
Test loss: 4.85898687363
Test accuracy 0.679375
Total params: 7,881,604
Trainable params: 7,881,604
Non-trainable params: 0
adamax = Adamax(lr=0.002, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Num of Filters	64		128			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(3,3)	(3,3)	(3,3)	(3,3)								
Padding	valid		valid									
activation	relu		relu			relu		relu		relu		softmax

Epoch 38/50
250/250 [==============================] - 233s - loss: 0.3891 - acc: 0.7868 - val_loss: 0.4481 - val_acc: 0.7453
Test loss: 5.97175711632
Test accuracy 0.6175
Total params: 67,712,388
Trainable params: 67,712,388
Non-trainable params: 0
adamax = Adamax(lr=0.002, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Num of Filters	64		128			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)								
Padding	valid		valid									
activation	relu		relu			relu		relu		relu		softmax

Epoch 23/50
250/250 [==============================] - 220s - loss: 0.3856 - acc: 0.7742 - val_loss: 0.3724 - val_acc: 0.7694
Test loss: 4.66581215262
Test accuracy 0.683125

Total params: 2,288,004
Trainable params: 2,288,004
Non-trainable params: 0
adamax = Adamax(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #prev 0.002

Num of Filters	64		128			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)								
Padding	valid		valid									

Convolutional Neural Network Architecture

Loss at Epoch from Early Stopping Callback: Single-label Output

activation	relu		relu			relu		relu		relu		softmax

Epoch 30/50
250/250 [==============================] - 233s - loss: 0.3466 - acc: 0.8096 - val_loss: 0.3560 - val_acc: 0.7869
Test loss: 4.95138476849
Test accuracy 0.673125
Total params: 4,041,156
Trainable params: 4,041,156
Non-trainable params: 0
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Num of Filters	128		256			512		512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)								
Padding	valid		valid									
activation	relu		relu			relu		relu		relu		softmax

Epoch 27/50
250/250 [==============================] - 239s - loss: 0.5080 - acc: 0.7074 - val_loss: 0.5287 - val_acc: 0.7019
Test loss: 3.69877340741
Test accuracy 0.656875
Total params: 8,145,284
Trainable params: 8,144,772
Non-trainable params: 512
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 30/50
250/250 [==============================] - 237s - loss: 0.3468 - acc: 0.8114 - val_loss: 0.3741 - val_acc: 0.7847
Test loss: 4.91565843821
Test accuracy 0.68625
Total params: 7,618,948
Trainable params: 7,618,948
Non-trainable params: 0
adamax = Adamax(lr=0.002, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0)

Num of Filters	128		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 27/50
250/250 [==============================] - 238s - loss: 0.3517 - acc: 0.8049 - val_loss: 0.3720 - val_acc: 0.7815
Test loss: 4.88308211803
Test accuracy 0.6825
Total params: 7,618,948
Trainable params: 7,618,948
Non-trainable params: 0
adadelta = Adadelta(lr=1.0, rho=0.95, epsilon=1e-08, decay=0.0)

Num of Filters	128		256			512		4

Convolutional Neural Network Architecture

Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 30/30
250/250 [==============================] - 249s - loss: 0.3486 - acc: 0.8160 - val_loss: 0.3526 - val_acc: 0.7875
Test loss: 5.13014283419
Test accuracy 0.67125
Total params: 7,881,604
Trainable params: 7,881,604
Non-trainable params: 0

adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		256			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 23/50
250/250 [==============================] - 245s - loss: 0.3473 - acc: 0.8060 - val_loss: 0.3770 - val_acc: 0.7841
Test loss: 4.94794062287
Test accuracy 0.68625
Total params: 7,022,148
Trainable params: 7,022,148
Non-trainable params: 0
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		256			256		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

250/250 [==============================] - 246s - loss: 0.3944 - acc: 0.7871 - val_loss: 0.4318 - val_acc: 0.7507
Test loss: 5.17871149302
Test accuracy 0.658125
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001
use adamax, adelta

Num of Filters	64		256			256		256		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.25)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 24/50
250/250 [==============================] - 235s - loss: 0.3744 - acc: 0.7946 - val_loss: 0.3736 - val_acc: 0.7750
Test loss: 4.62821881056
Test accuracy 0.6975
Total params: 3,875,396

Loss at Epoch from Early Stopping Callback: Single-label Output

Convolutional Neural Network Architecture

Loss at Epoch from Early Stopping Callback: Single-label Output

Trainable params: 3,875,396
Non-trainable params: 0
adam = Adam(lr=0.0005, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		256			512		256		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout Gaussian (0.35)	Dense()	Dropout Gaussian (0.15)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 26/50
250/250 [==============================] - 252s - loss: 0.3698 - acc: 0.7959 - val_loss: 0.3750 - val_acc: 0.7695
Test loss: 4.73596389294
Test accuracy 0.685625
Total params: 7,152,452
Trainable params: 7,152,452
Non-trainable params: 0
Png_data 300 by 300 with preprocessing during training
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		128			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 15/50
125/125 [==============================] - 175s - loss: 0.3572 - acc: 0.8054 - val_loss: 0.4148 - val_acc: 0.7624
Test loss: 3.65027219772
Test accuracy 0.755
Total params: 3,515,844
Trainable params: 3,515,844
Non-trainable params: 0
Cnn_copy_sobel.py
Png_data 200 by 200 without preprocessing during training
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		128			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 15/50
208/207 [==============================] - 52s - loss: 0.1825 - acc: 0.9340 - val_loss: 0.1791 - val_acc: 0.9248
Test loss: 1.07142833689
Test accuracy 0.932214765101
Total params: 1,615,812
Trainable params: 1,615,812
Non-trainable params: 0
Cnn_copy_sobel.py
Png_data 200 by 200 without preprocessing during training
adam = Adam(lr=0.001, beta_1=0.9, beta_2=0.999, epsilon=1e-08, decay=0.0) #previously 0.001

Num of Filters	64		128			512		512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout	Dense()	Dropout	Dense()

Convolutional Neural Network Architecture

Loss at Epoch from Early Stopping Callback: Single-label Output

							(0.35)		(0.35)	
Conv. Size	(6,6)	(6,6)	(6,6)	(6,6)						
Padding	valid		valid							
activation	relu		relu			relu		relu		softmax

Epoch 19/50
208/207 [==============================] - 52s - loss: 0.1613 - acc: 0.9393 - val_loss: 0.1440 - val_acc: 0.9431
Test loss: 0.796894465397
Test accuracy 0.94966442953
Total params: 1,615,812
Trainable params: 1,615,812
Non-trainable params: 0
Cnn_copy_sobel_test.py
Png_data 200 by 200 without preprocessing during training
Adadelta = Adadelta(lr=1.0, rho=0.95, epsilon=1e-08, decay=0.0)

Num of Filters	128		128			512		4
Layer Type	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dropout (0.35)	Dense()
Conv. Size	(6,6)	(6,6)	(3,3)	(3,3)				
Padding	valid		valid					
activation	relu		relu			relu		softmax

Epoch 8/50
208/207 [==============================] - 59s - loss: 0.1559 - acc: 0.9468 - val_loss: 0.1421 - val_acc: 0.9425
Test loss: 1.02644992199
Test accuracy 0.935570469799
Total params: 6,717,700
Trainable params: 6,717,700
Non-trainable params: 0
Adam optimizer 0.001

Num of Filters	64	64		128		256			512	512	512	4
Layer Type	CONV_2D	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	CONV_2D	MAXPOOL	Flatten()	Dense()	Dense()	Dense()	Dense()
Conv. Size	(3,3)	(6,6)	(6,6)	(6,6)	(6,6)	(2,2)	(2,2)		Dropout (0.25)	Dropout (0.15)	Dropout (0.15)	
Padding	valid	valid		valid		valid						
activation	relu	relu		relu		relu			relu	relu	relu	softmax

Epoch 18/30
438/437 [==============================] - 865s - loss: 0.2892 - acc: 0.8679 - val_loss: 0.2464 - val_acc: 0.8774
Test loss: 1.59995680253
Test accuracy 0.873462581003
Total params: 1,234,628
Trainable params: 1,234,628
Non-trainable params: 0