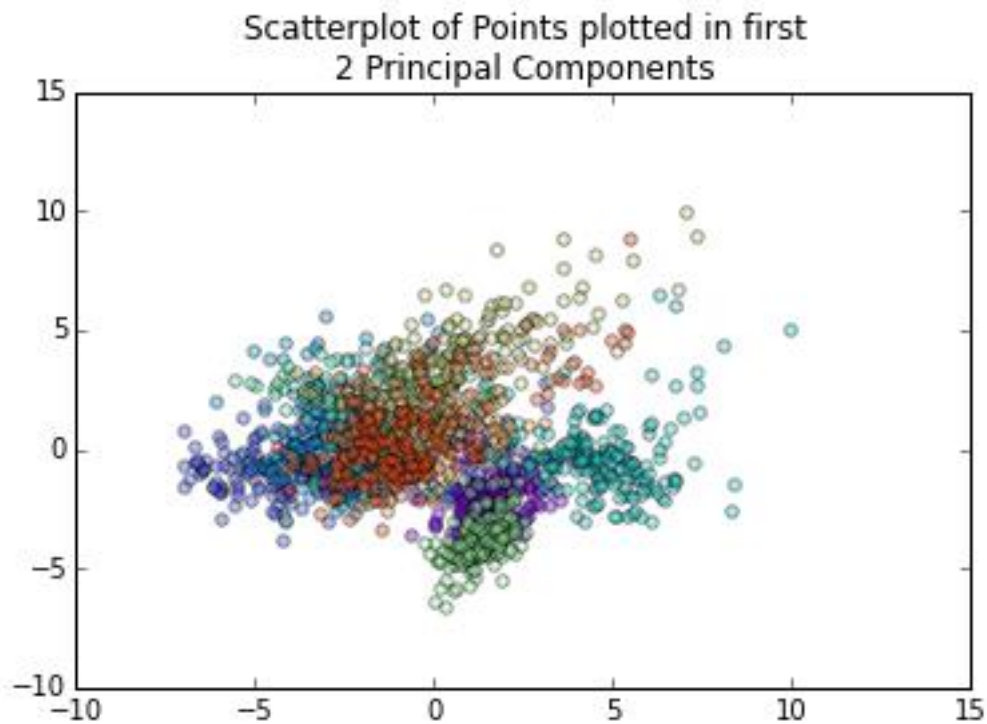


## Chapter 1 - Unsupervised Machine Learning



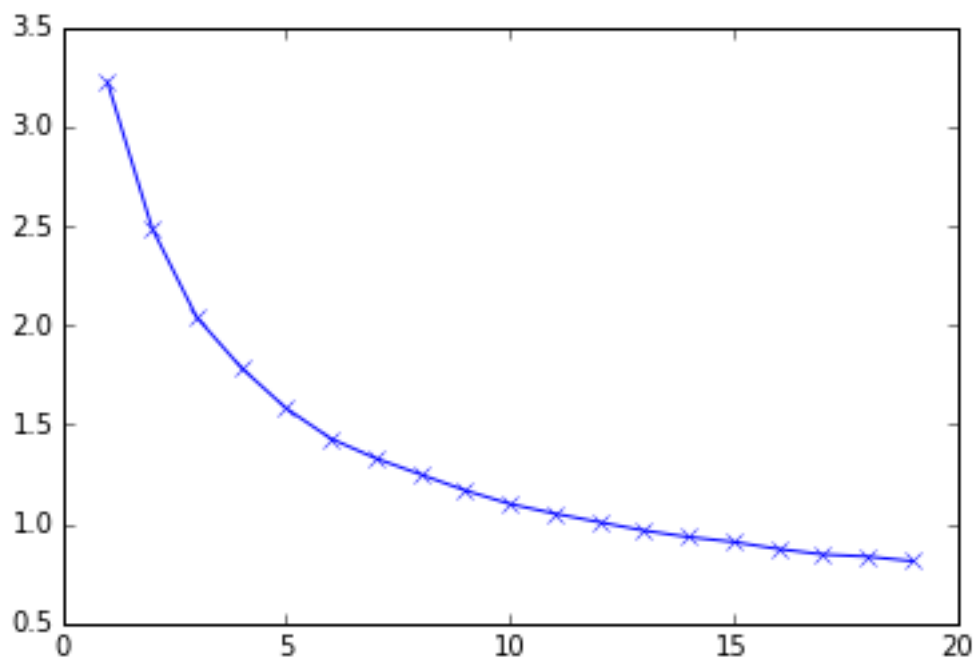
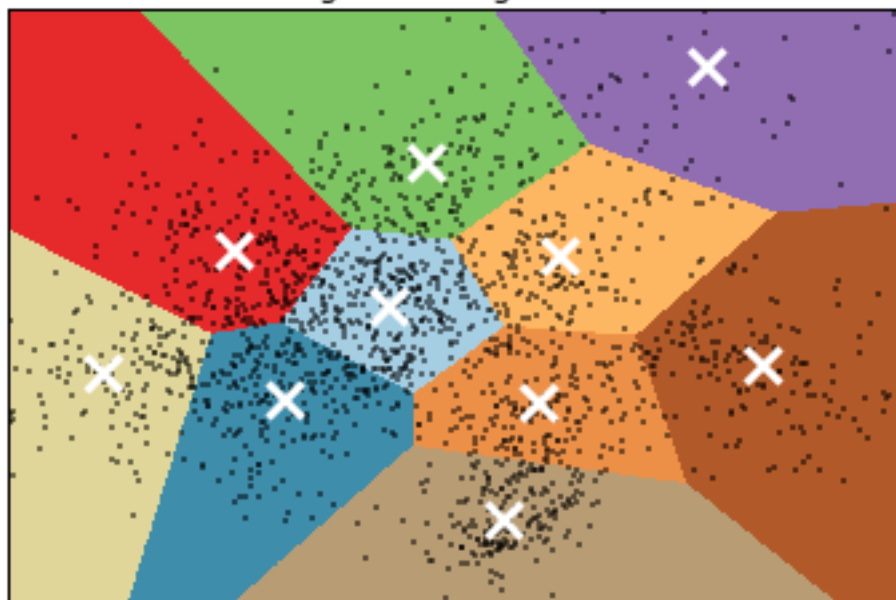
n\_digits: 10, n\_samples 1797, n\_features 64

init	time	inertia	homo	compl	v-meas	ARI	AMI	silhouette
k-means++	0.25s	69517	0.596	0.643	0.619	0.465	0.592	0.123

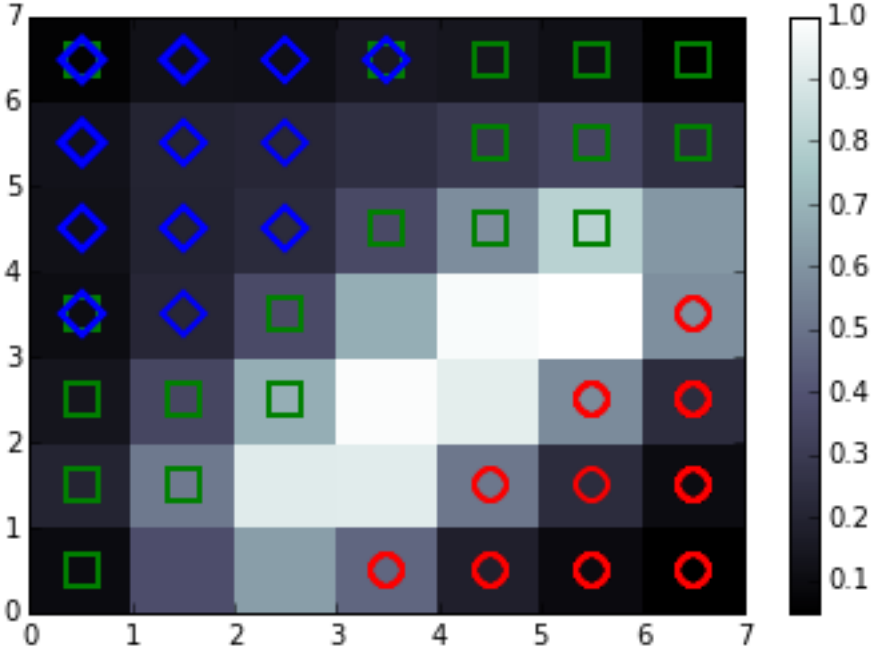
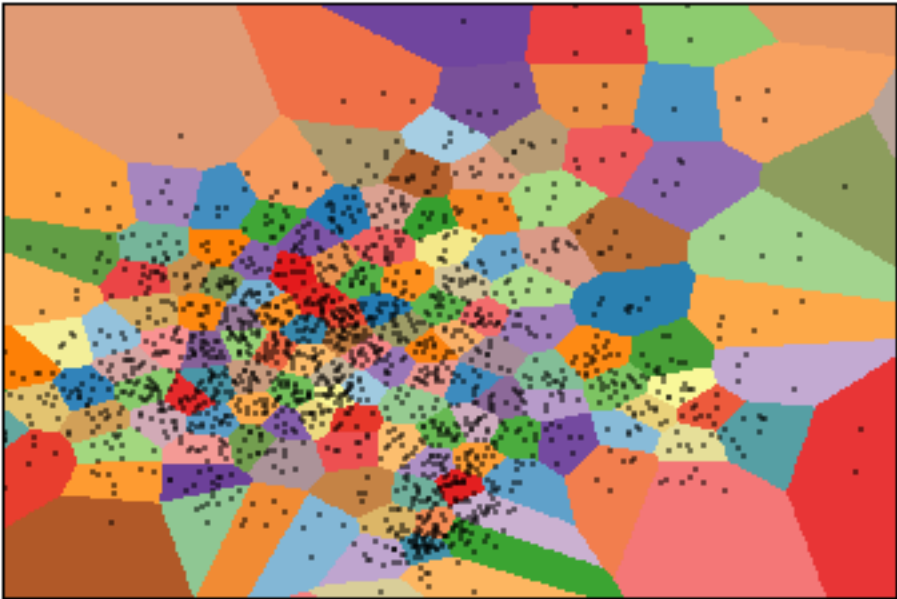
n\_digits: 10, n\_samples 1797, n\_features 64

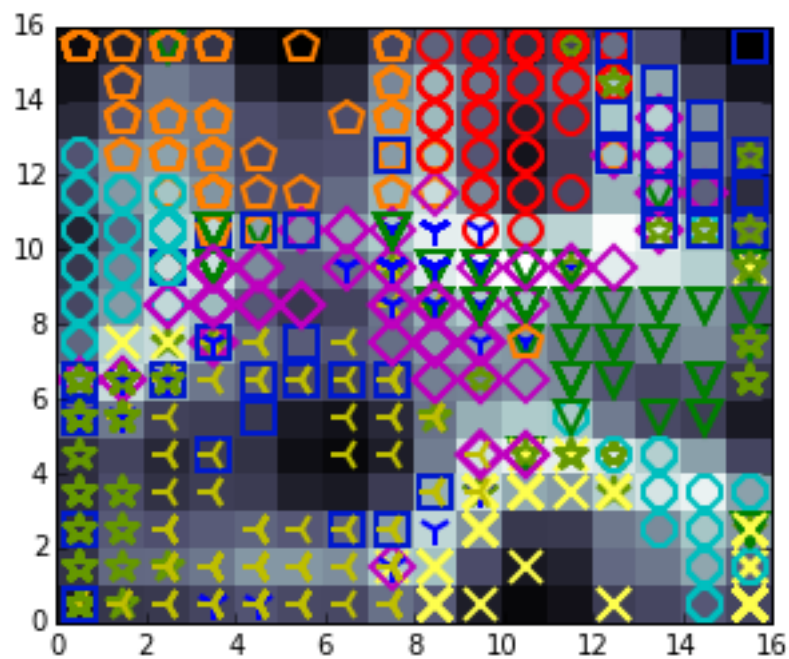
init	time	inertia	homo	compl	v-meas	ARI	sil
PCA-based	0.02s	71820	0.673	0.715	0.693	0.567	0.1

K-means clustering on the digits dataset with  $K = 10$

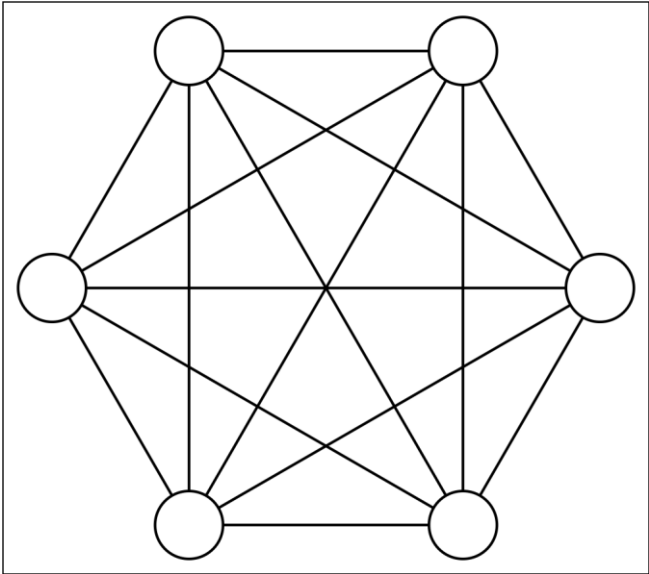
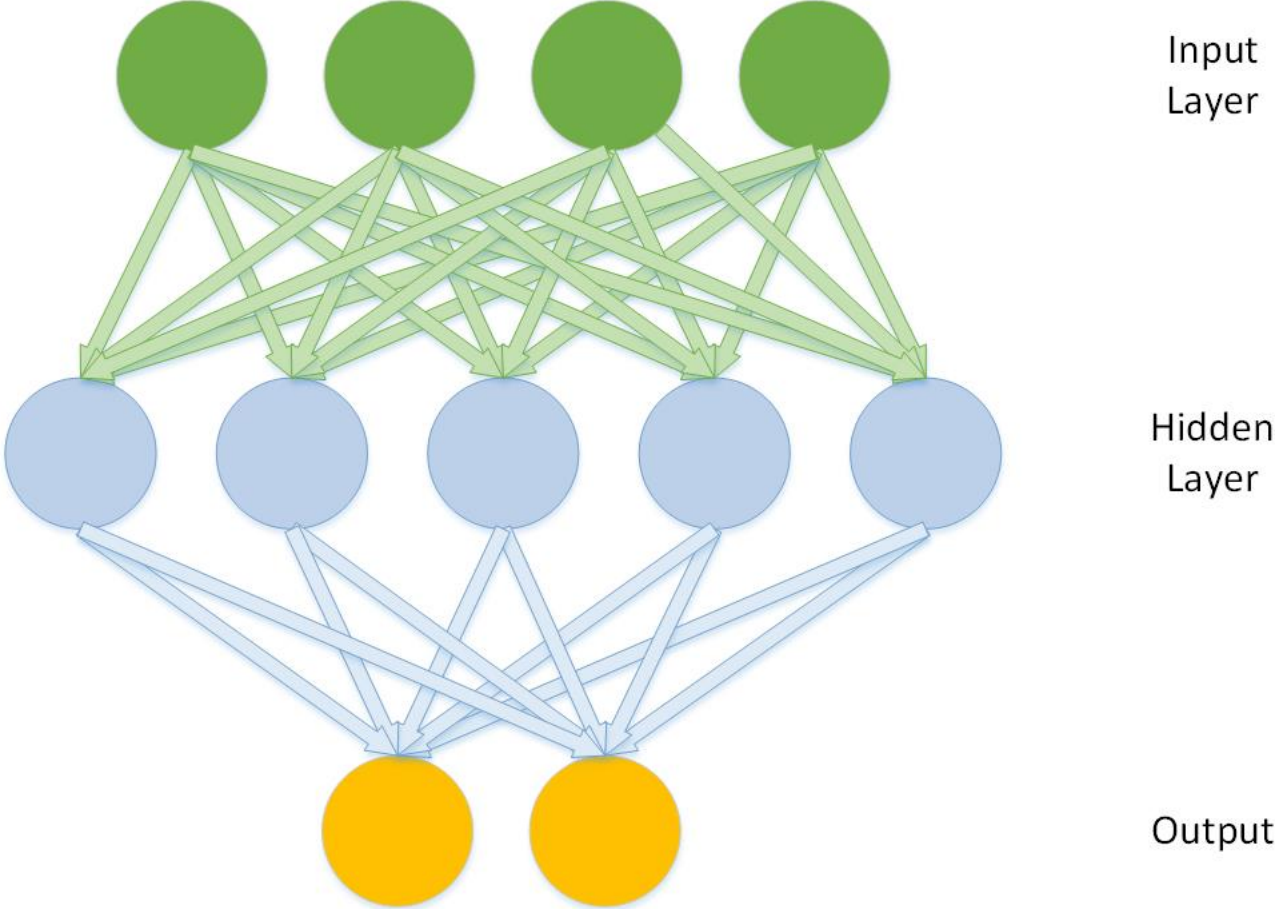


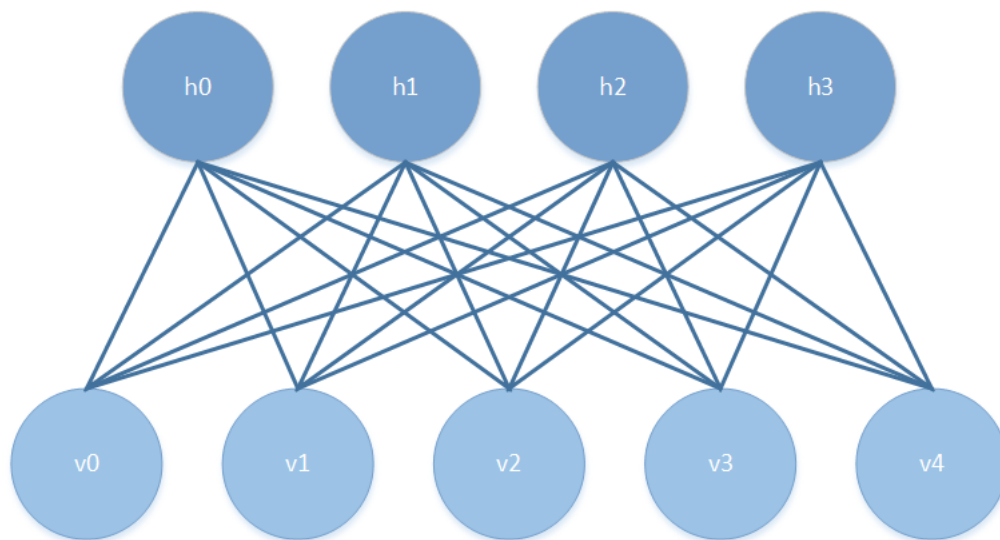
K-means clustering on the digits dataset with  $K = 150$  - demonstrative of overfitting



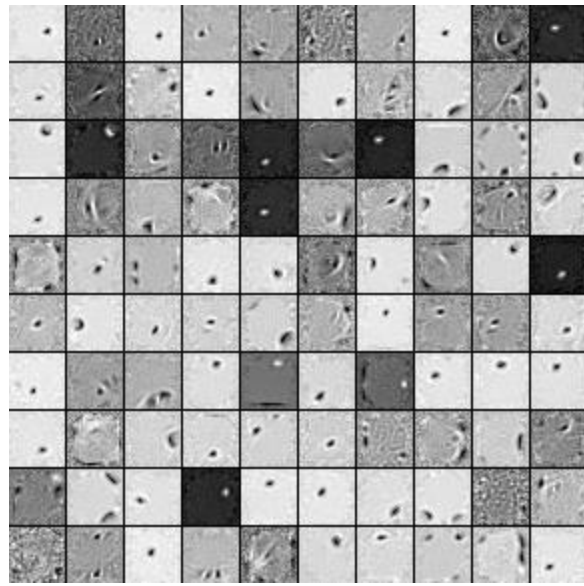


# Chapter 2 - Deep Belief Networks

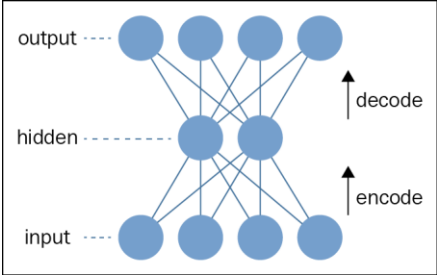




7 9 6 2 8 8 0 8 2 8 8 9 8 8 9 8 6 9 2 2  
 7 6 6 2 8 8 0 8 2 8 8 9 8 8 6 8 6 9 2 2  
 7 6 6 2 8 8 0 8 2 8 8 6 8 8 6 8 6 4 2 2  
 7 6 6 2 8 8 0 8 2 8 8 6 8 8 6 8 6 9 2 2  
 7 6 6 2 8 8 0 8 2 8 8 6 8 8 6 8 6 4 2 2  
 9 6 6 2 8 8 0 8 2 8 8 6 8 8 6 8 6 9 2 2  
 9 6 6 2 8 8 0 8 2 8 8 6 8 8 6 8 6 9 2 2  
 9 6 6 2 8 8 0 8 2 8 8 6 8 8 6 8 6 9 2 2  
 9 6 6 2 8 8 0 8 2 8 8 6 8 8 6 8 6 6 2 2

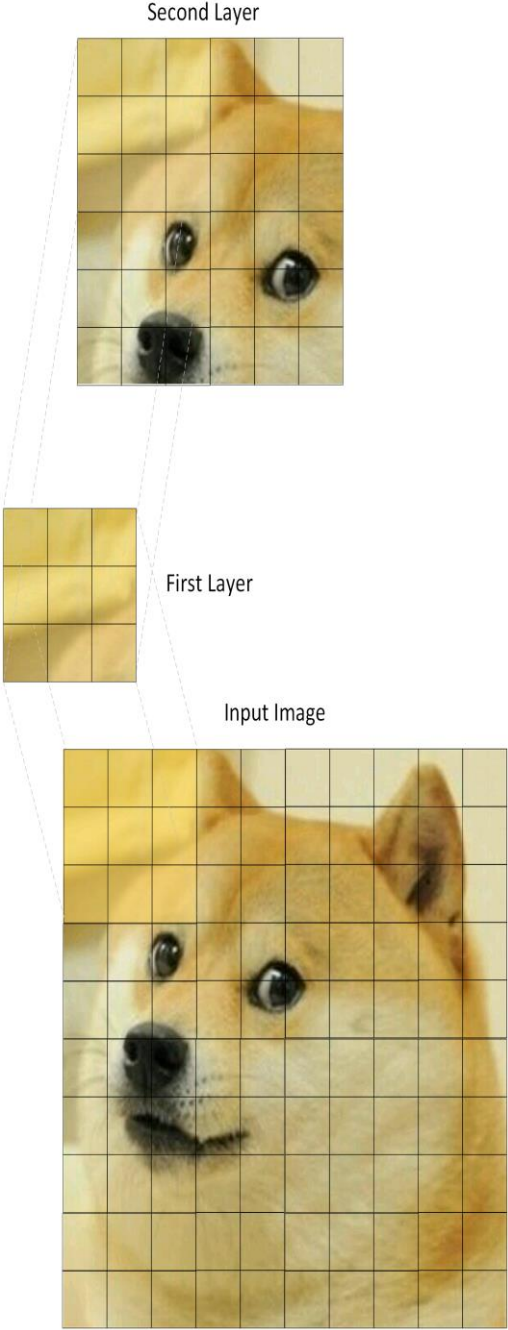


# Chapter 3 - Stacked Denoising Autoencoders

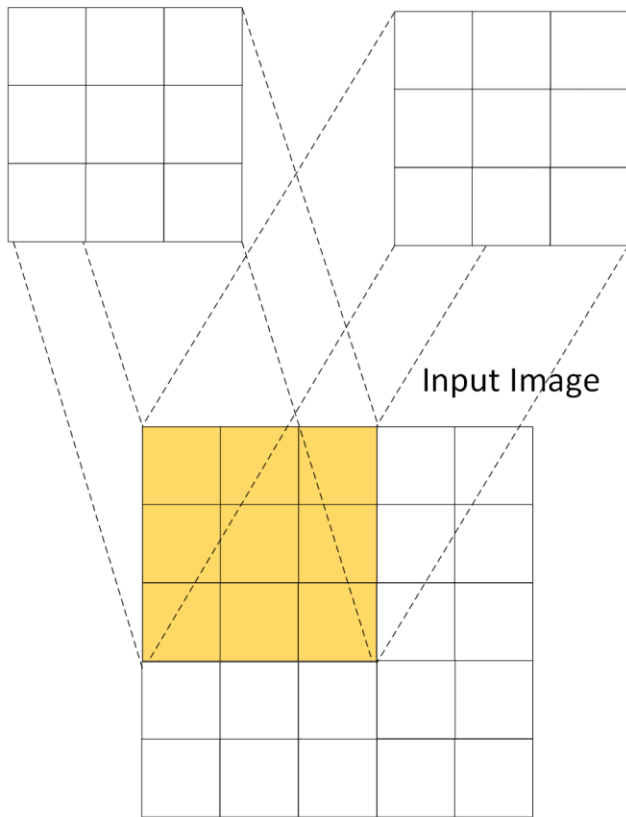




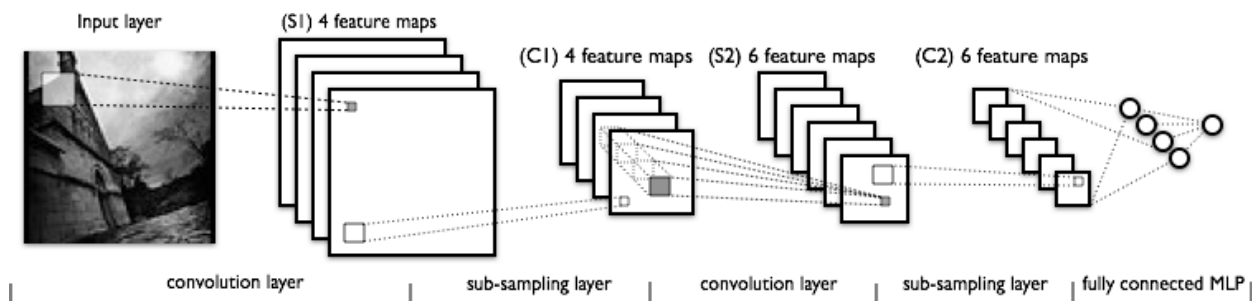
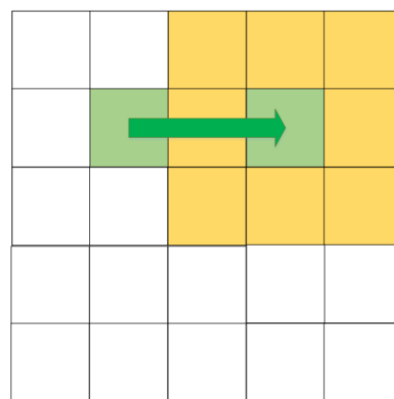
# Chapter 4 - Convolutional Neural Networks

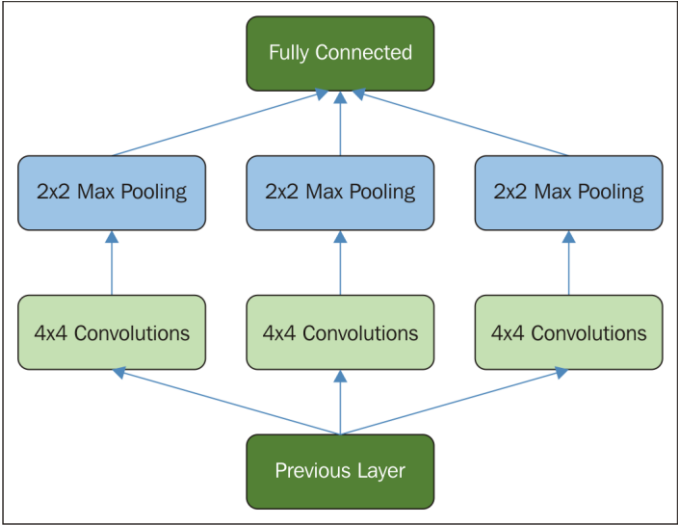
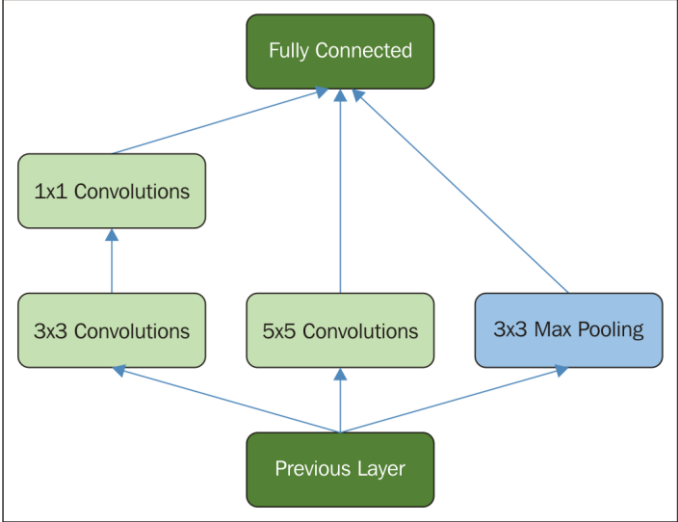


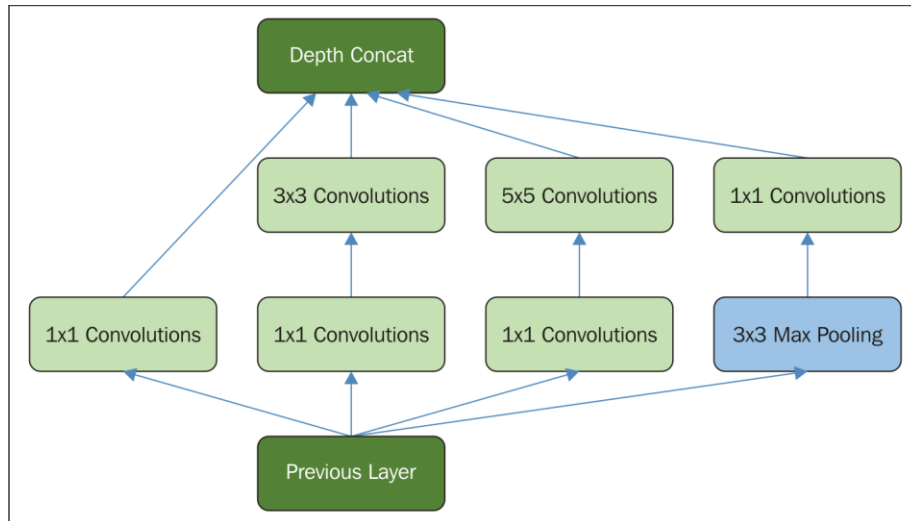
Depth = 2



Stride = 2







airplane



automobile



bird



cat



deer



dog



frog



horse



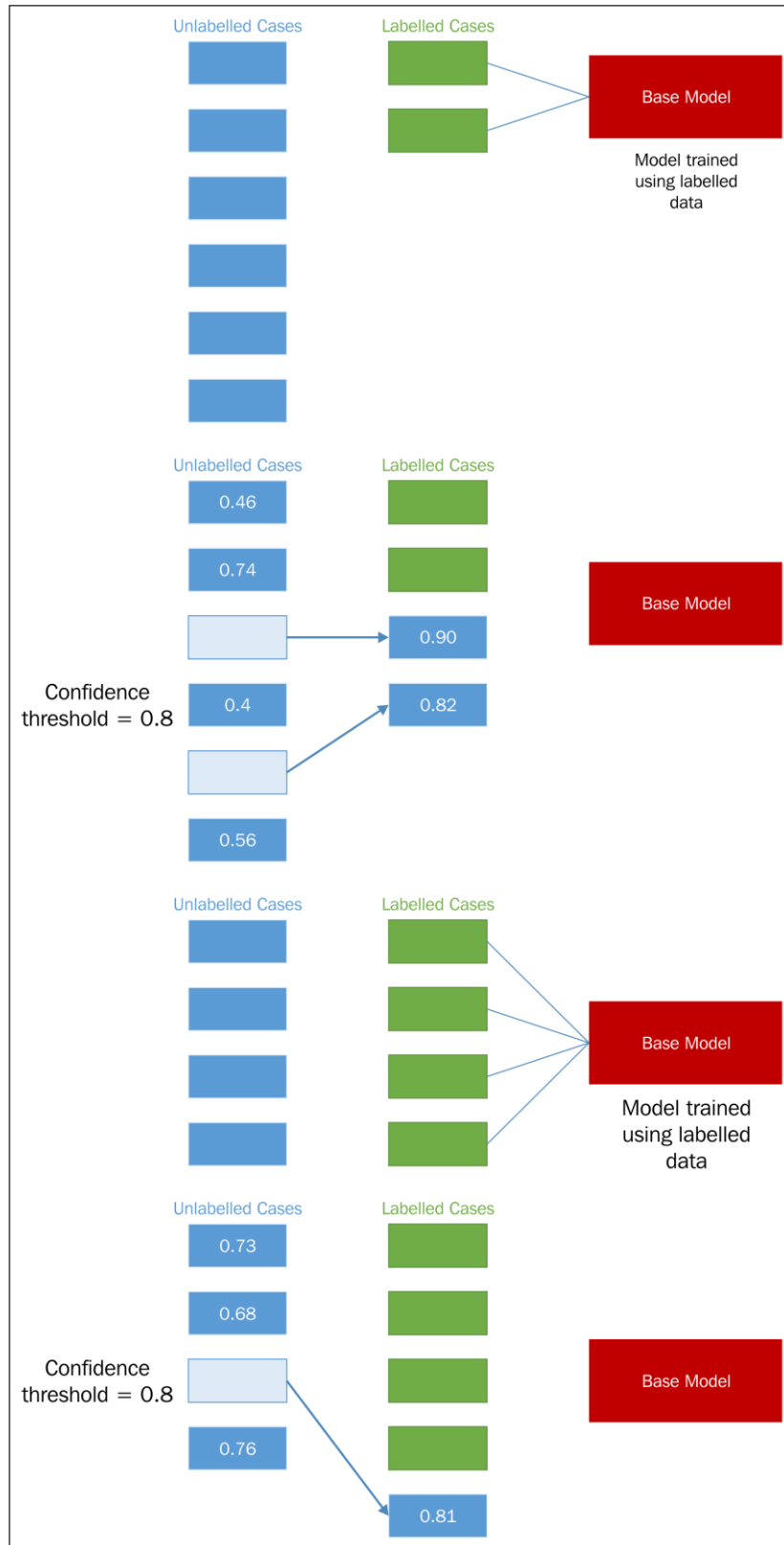
ship

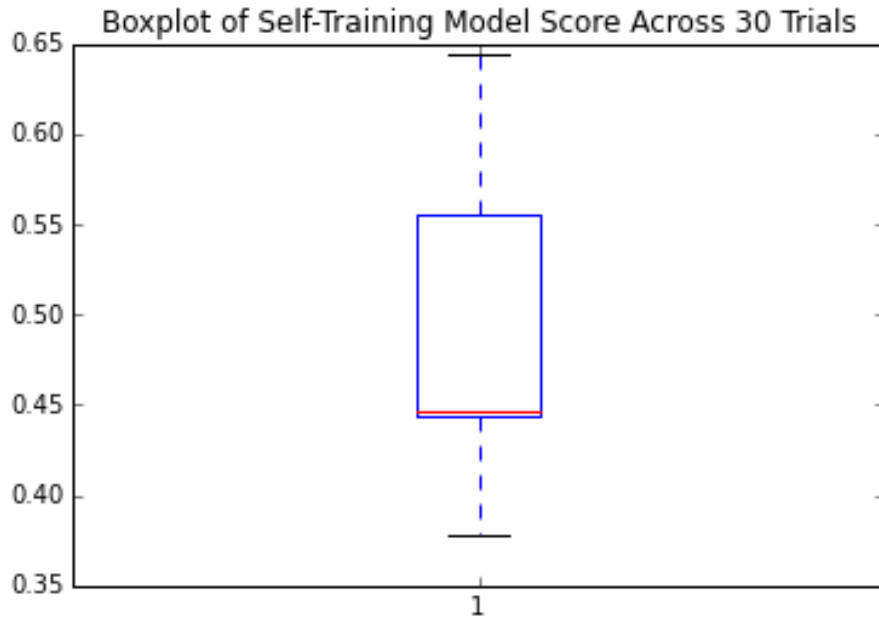


truck



# Chapter 5 - Semi-Supervised Learning

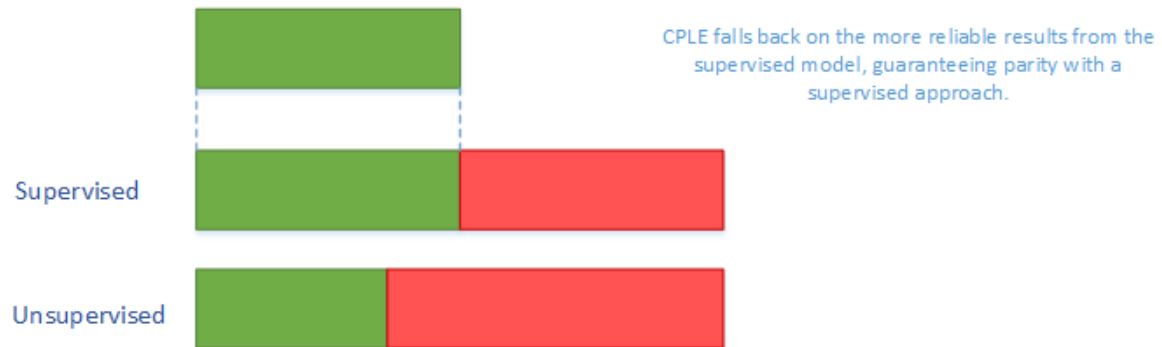




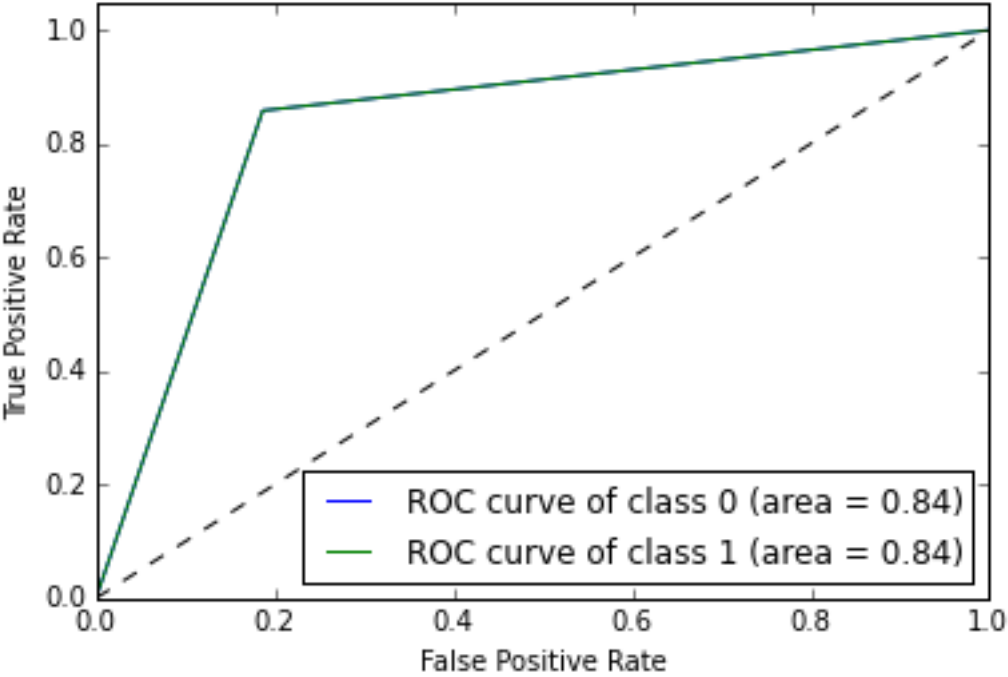
When the semi-supervised model correctly classifies cases that the supervised model doesn't:



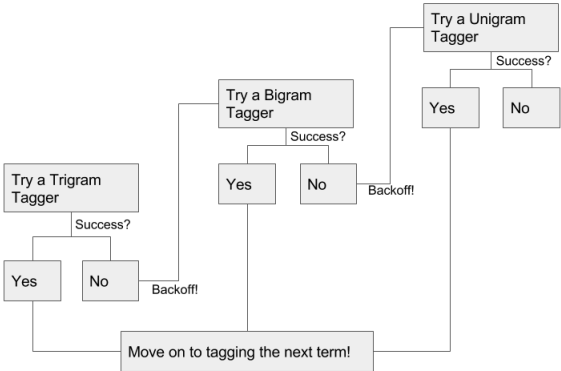
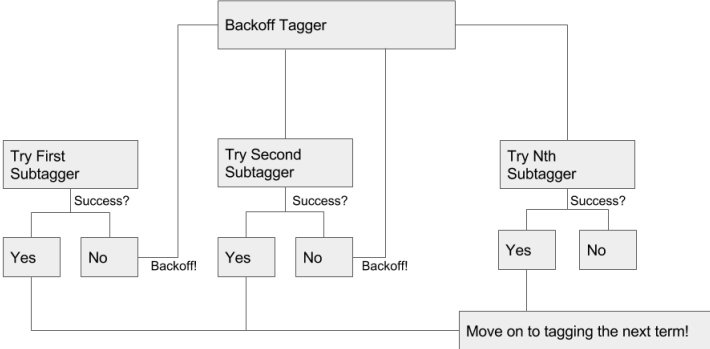
When the supervised model correctly classifies cases that the semi-supervised model doesn't:



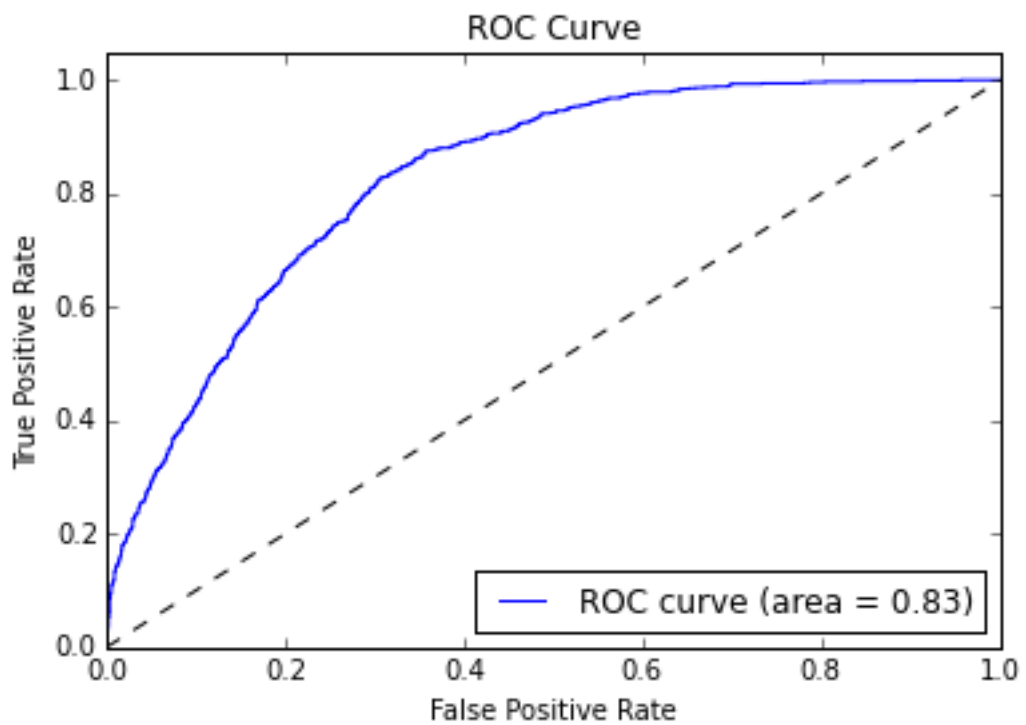
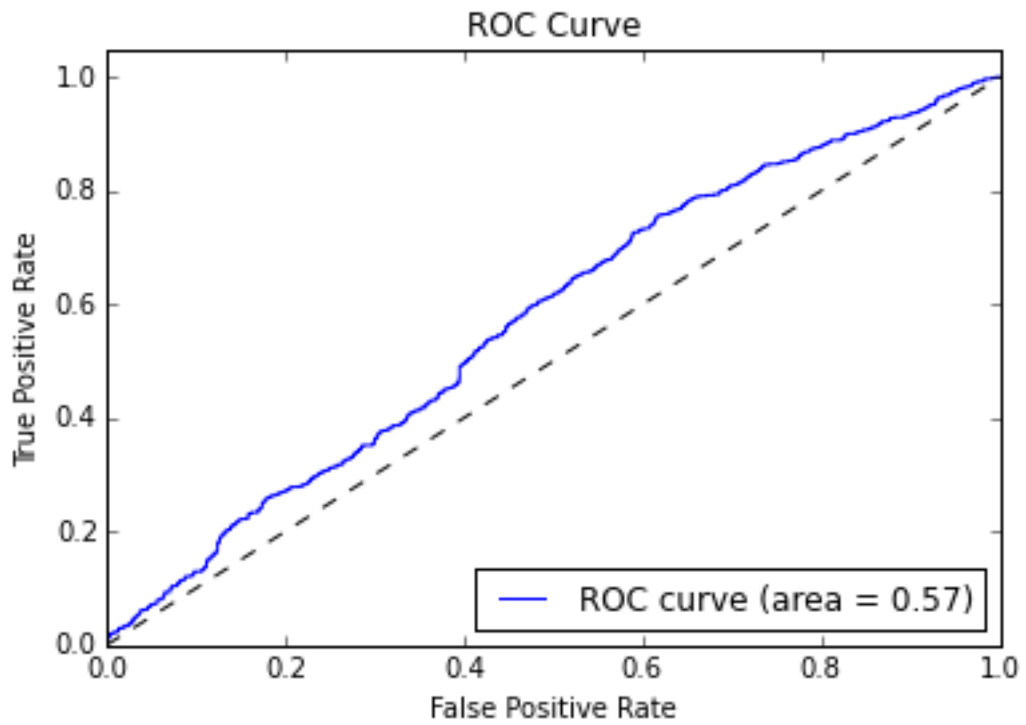
ROC curve for CPLE semi-supervised log.reg. classification of the Heart dataset



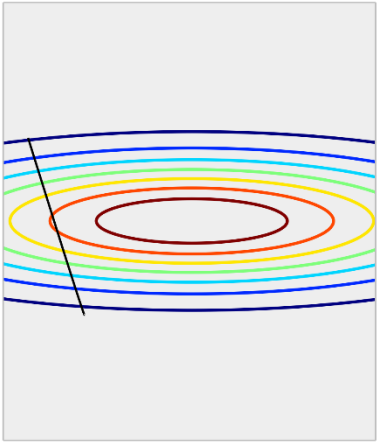
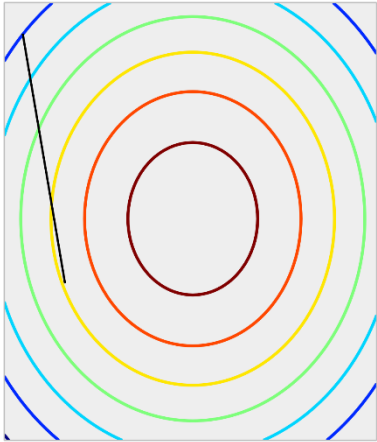
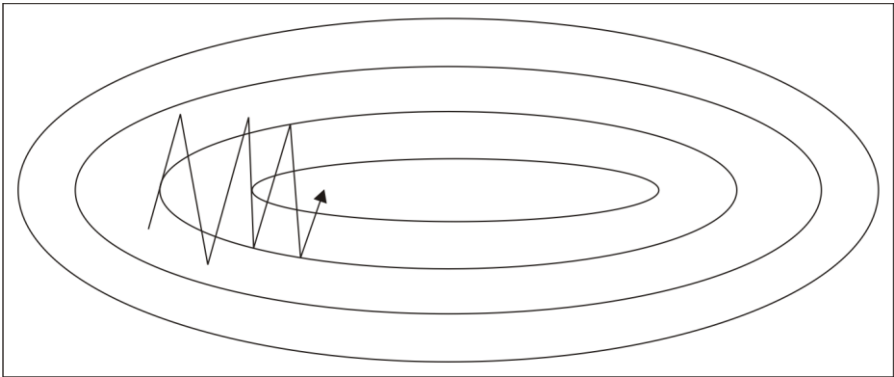
# Chapter 6 - Text Feature Engineering







# Chapter 7 - Feature Engineering Part II



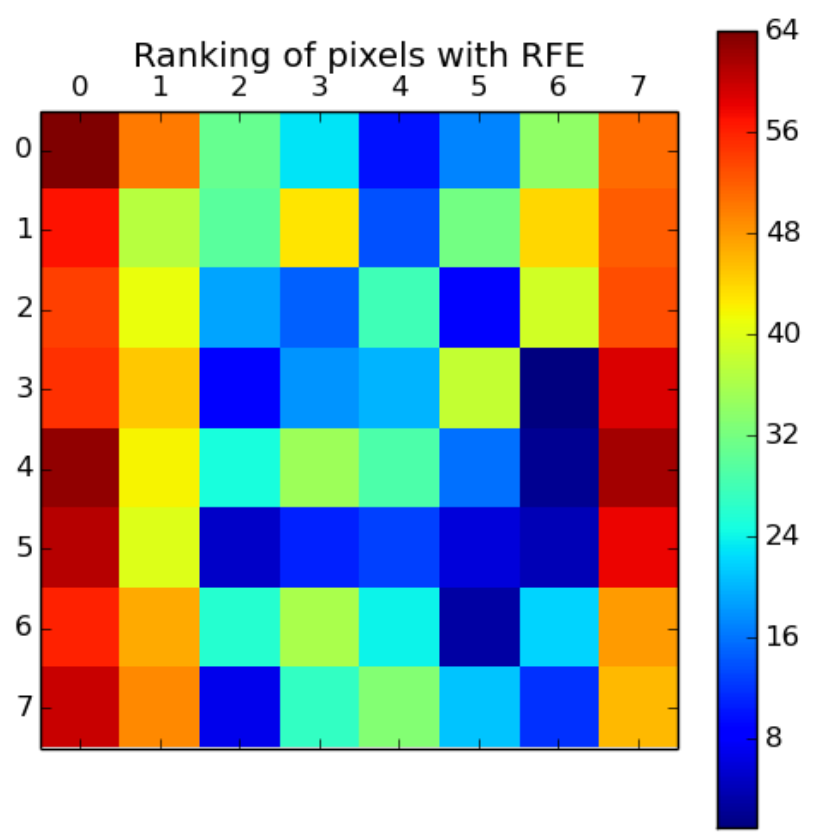
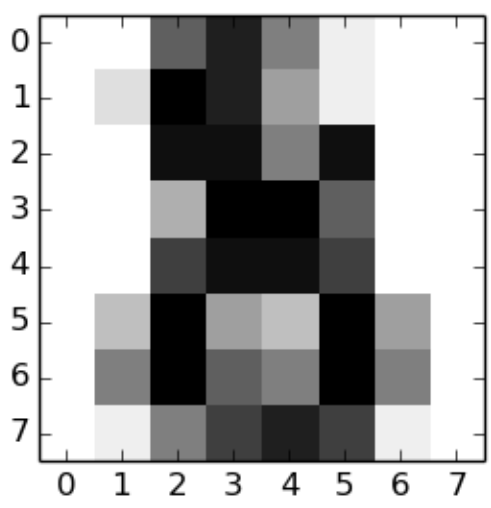
Statistic	Wealth
Min	<b>1</b>
First Quartile	<b>42.5</b>
Mean	<b>3205433.343</b>
Median	<b>600</b>
Third Quartile	<b>1358</b>
Max	<b>10000000000</b>

Range	Count of Cases
0 > 0.1	<b>3060</b>
0.1 > 0.2	<b>0</b>
0.2 > 0.3	<b>0</b>
0.3 > 0.4	<b>0</b>
0.4 > 0.5	<b>0</b>
0.5 > 0.6	<b>0</b>
0.6 > 0.7	<b>0</b>
0.7 > 0.8	<b>0</b>
0.8 > 0.9	<b>0</b>
0.9 > 1	<b>1</b>

Range	Count of Cases
0 > 0.1	<b>740</b>
0.1 > 0.2	<b>1633</b>
0.2 > 0.3	<b>544</b>
0.3 > 0.4	<b>141</b>
0.4 > 0.5	<b>0</b>
0.5 > 0.6	<b>1</b>
0.6 > 0.7	<b>0</b>
0.7 > 0.8	<b>1</b>
0.8 > 0.9	<b>0</b>
0.9 > 1	<b>1</b>

Case	Age	Gender
1	<b>22</b>	<b>M</b>
2	<b>25</b>	<b>M</b>
3	<b>34</b>	<b>F</b>
4	<b>23</b>	<b>M</b>
5	<b>25</b>	<b>F</b>
6	<b>41</b>	<b>F</b>

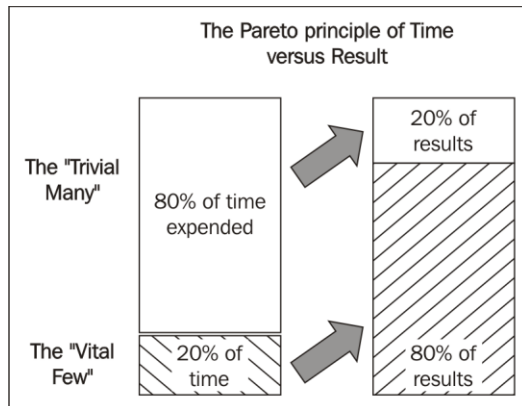
Case	Age_22	Age_23	Age_25	Age_34	Age_41	Gender_F	Gender_M
1	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
2	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
3	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
4	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
5	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
6	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>



		Actual Result	
		TRUE	FALSE
Prediction	TRUE	<b>True Positive</b>	<b>False Positive</b>
	FALSE	<b>False Negative</b>	<b>True Negative</b>

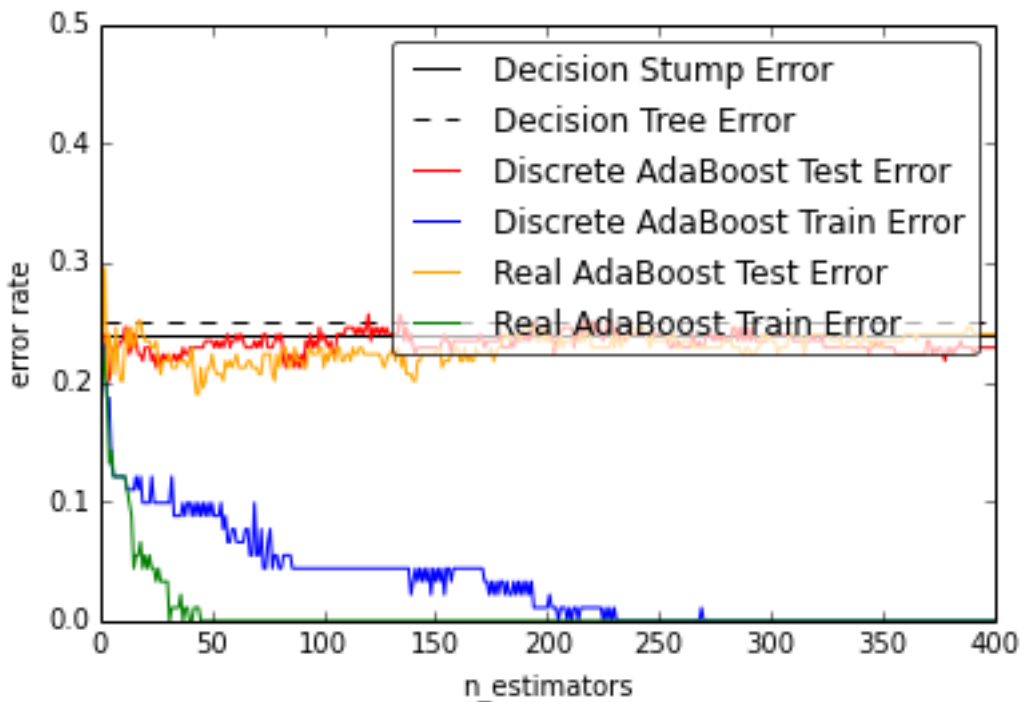
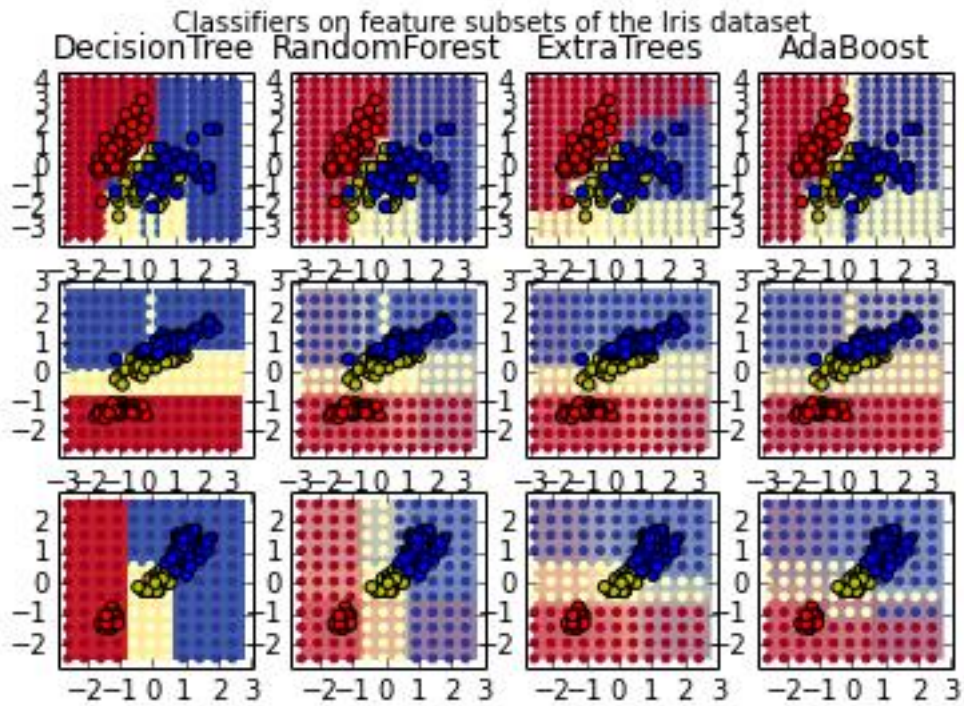
		Prediction	
		TRUE	FALSE
Actual Result	TRUE	<b>1</b>	<b>9</b>
	FALSE	<b>18</b>	<b>136</b>

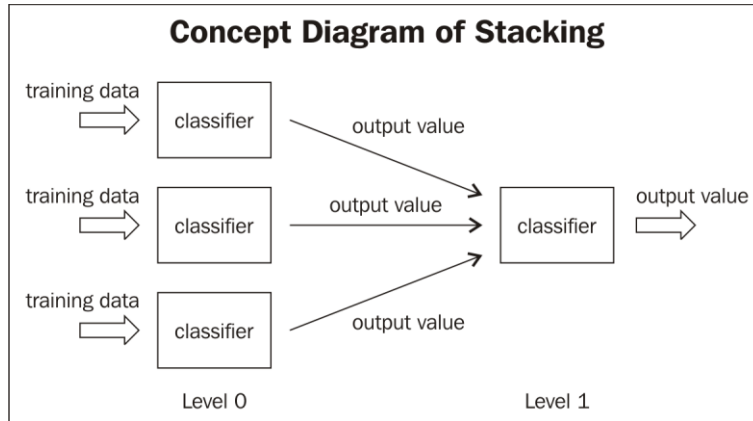
		Prediction	
		TRUE	FALSE
Actual Result	TRUE	<b>3</b>	<b>7</b>
	FALSE	<b>22</b>	<b>132</b>



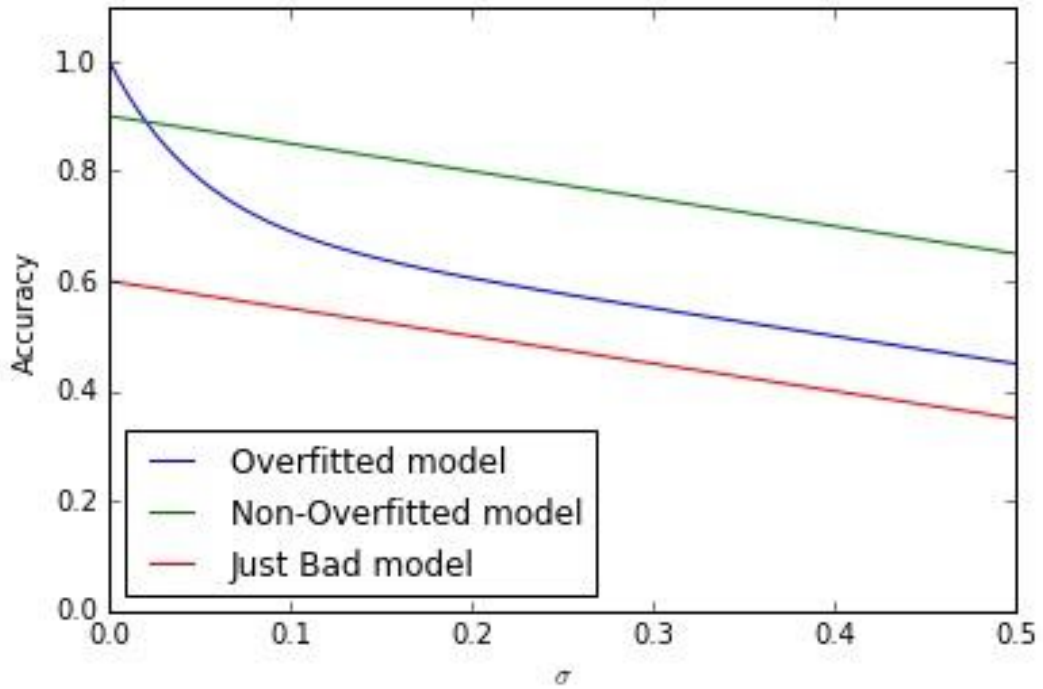
		Prediction	
		TRUE	FALSE
Actual Result	TRUE	<b>4</b>	<b>6</b>
	FALSE	<b>15</b>	<b>134</b>

## Chapter 8 - Ensemble Methods





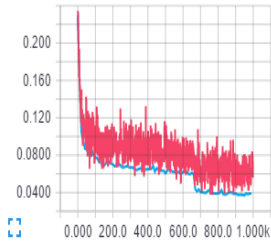
Expected decrease of accuracy in jitter test



# Chapter 9 - Additional Python Machine Learning Tools

cross entropy

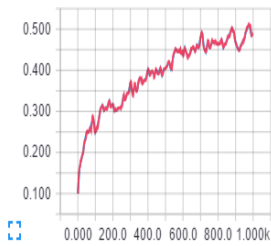
cross entropy



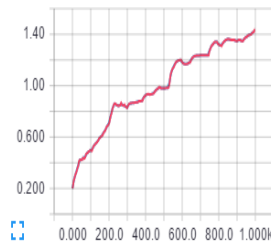
dropout\_keep\_probability

max

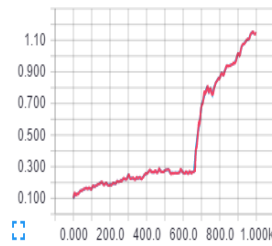
max/layer1/biases



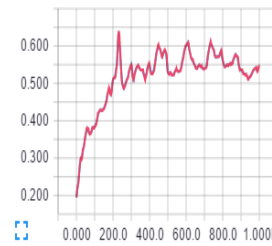
max/layer1/weights



max/layer2/biases

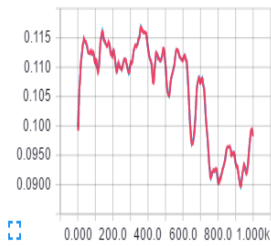


max/layer2/weights

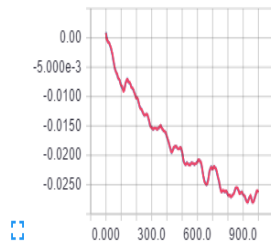


mean

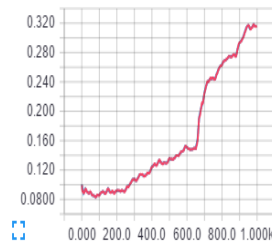
mean/layer1/biases



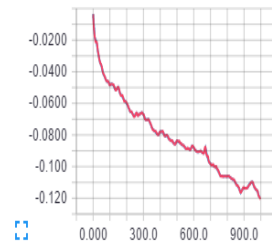
mean/layer1/weights



mean/layer2/biases



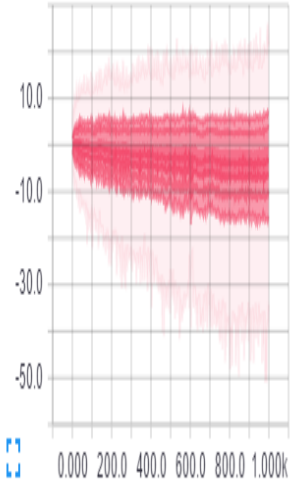
mean/layer2/weights



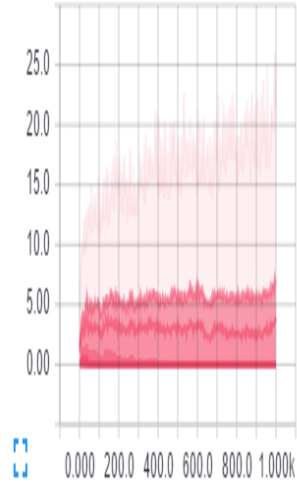


layer1

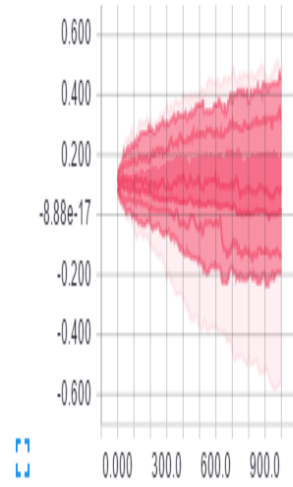
layer1/activations



layer1/activations\_relu



layer1/biases



layer1/weights

