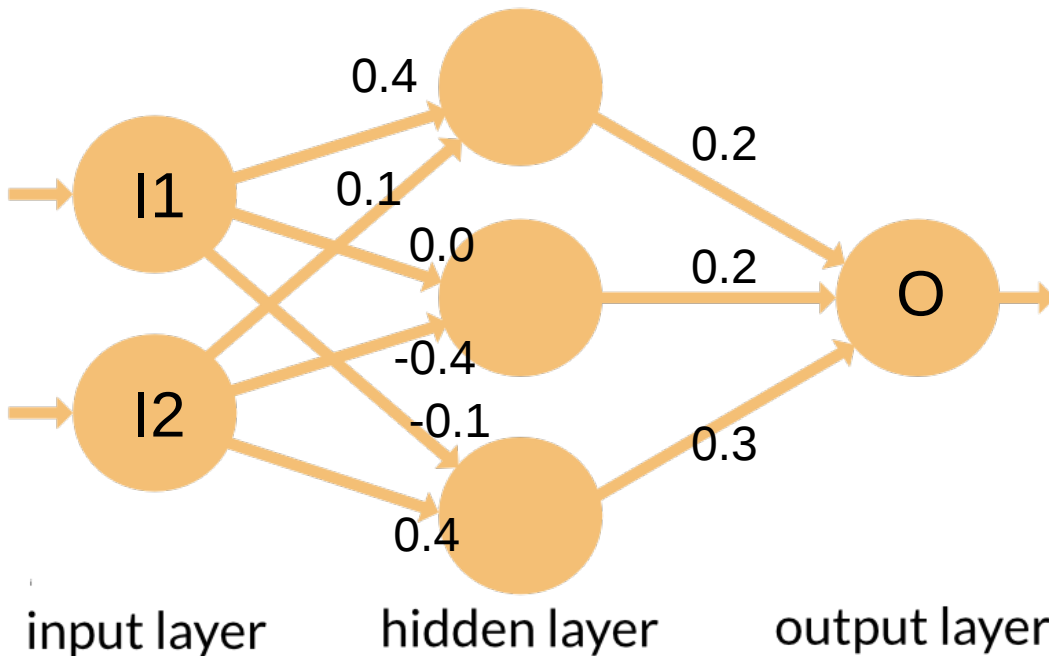
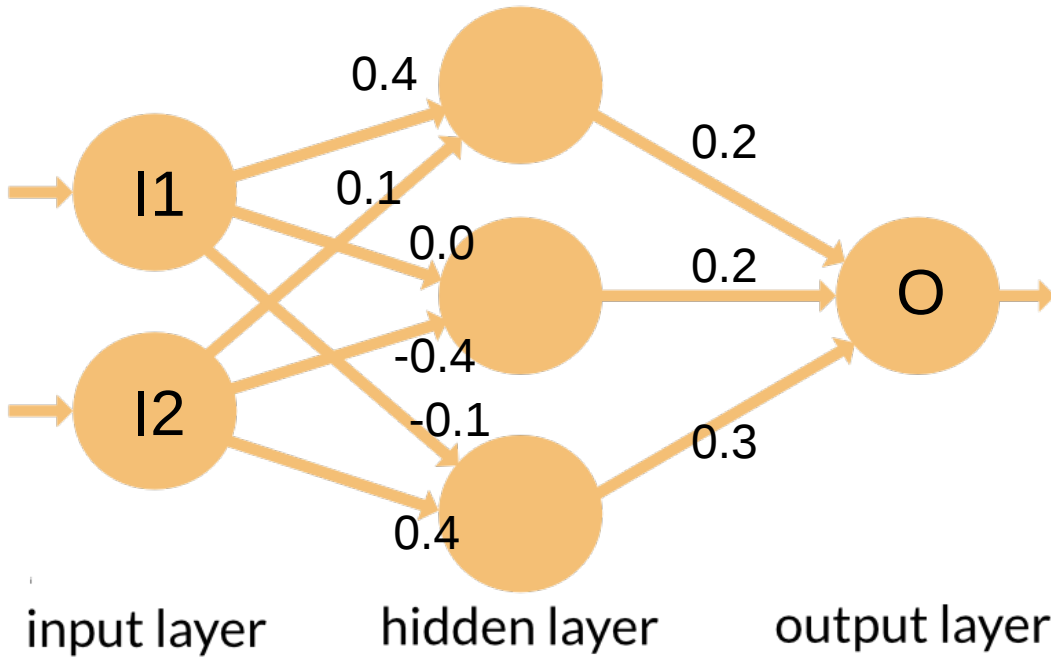


- Given the following NN with
 - assigned weights (see figure)
 - activation function $f(S) = \text{sign}(S-0.2)$ for all nodes
- Label the test set on the right, then compute accuracy, and precision & recall for both classes



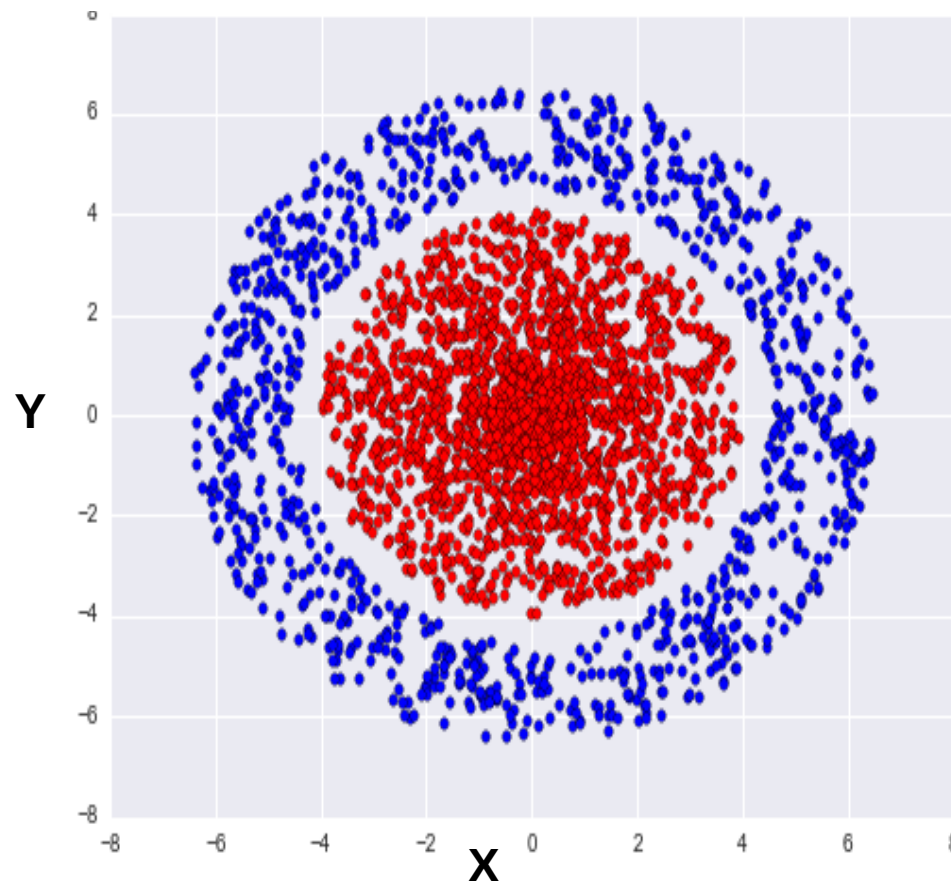
I1	I2	O
-1	+1	-1
+1	+1	+1
+1	-1	-1
+1	-1	+1
-1	+1	+1
+1	+1	+1
-1	-1	-1
+1	+1	-1
-1	-1	-1
+1	+1	+1



I1	I2	O
-1	+1	-1
+1	+1	+1
+1	-1	-1
+1	-1	+1
-1	+1	+1
+1	+1	+1
-1	-1	-1
+1	+1	-1
-1	-1	-1
+1	+1	+1

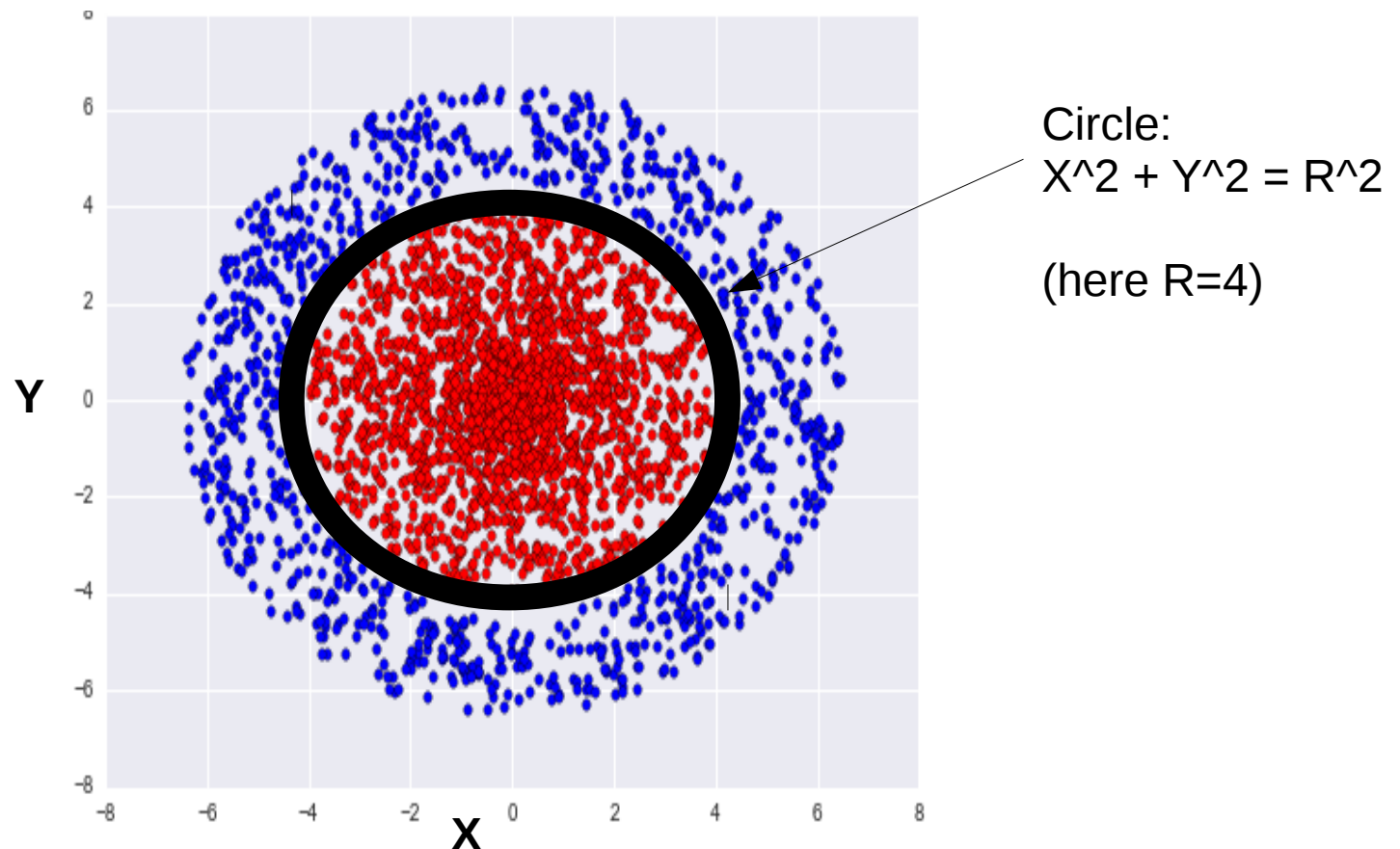
SVM

- Transform the 2-d dataset below into a higher dimensional space to make colors separable
 - E.g. from (X, Y) data to (X, Y, Z) , with $Z = X + Y$



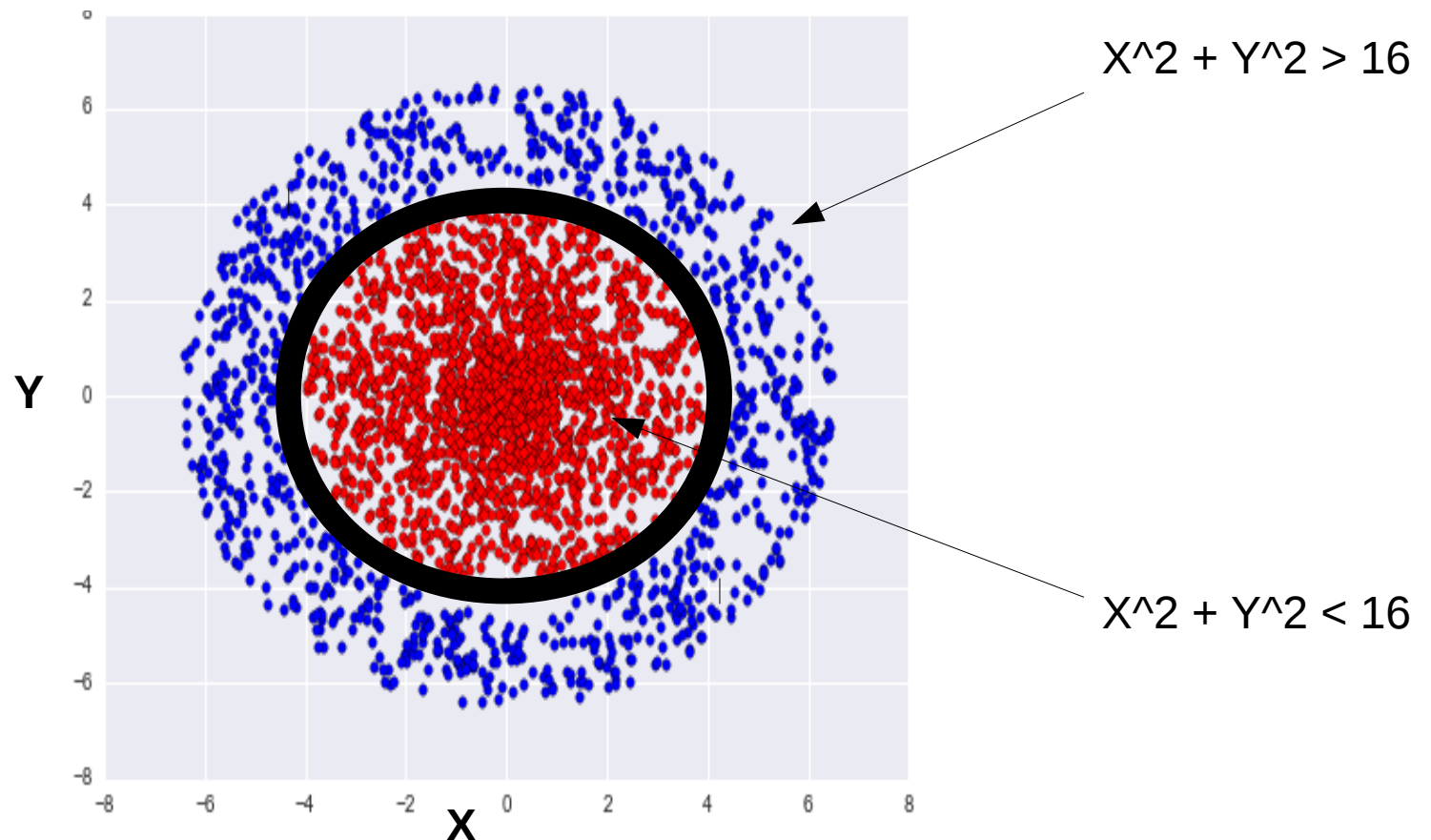
SVM

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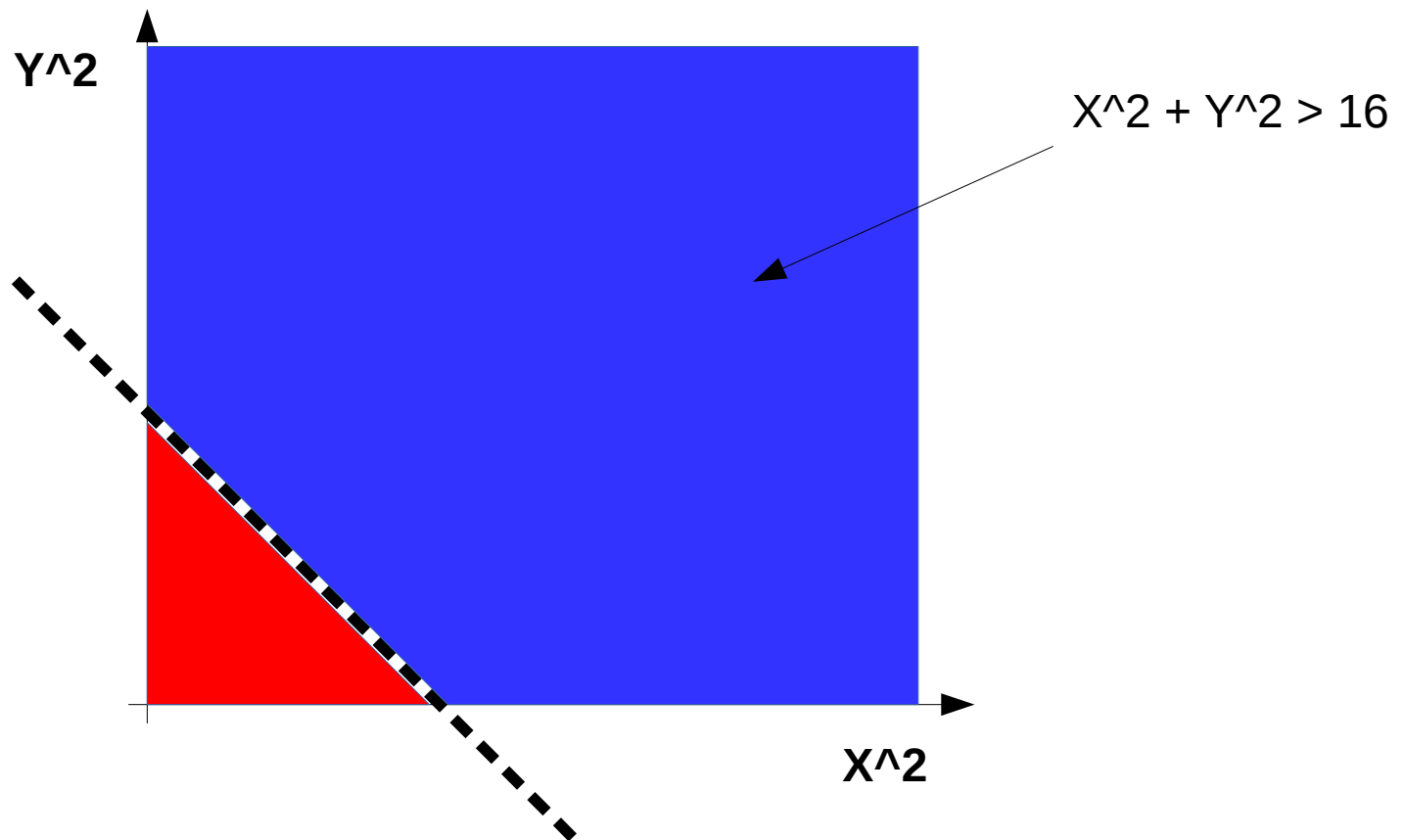
SVM

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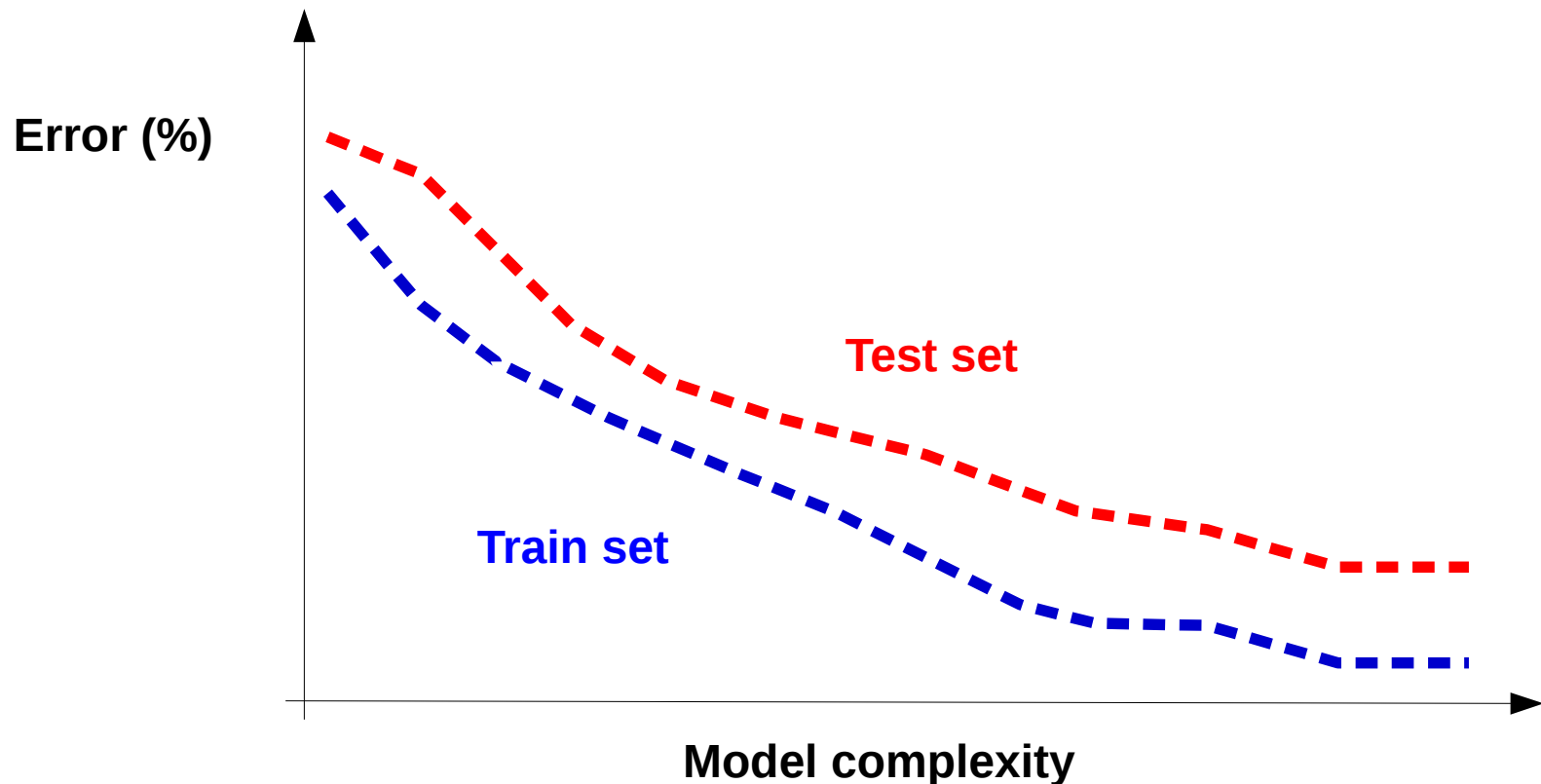
SVM

- Simplest solution: $(X, Y) \rightarrow (X, Y, X^2, Y^2)$



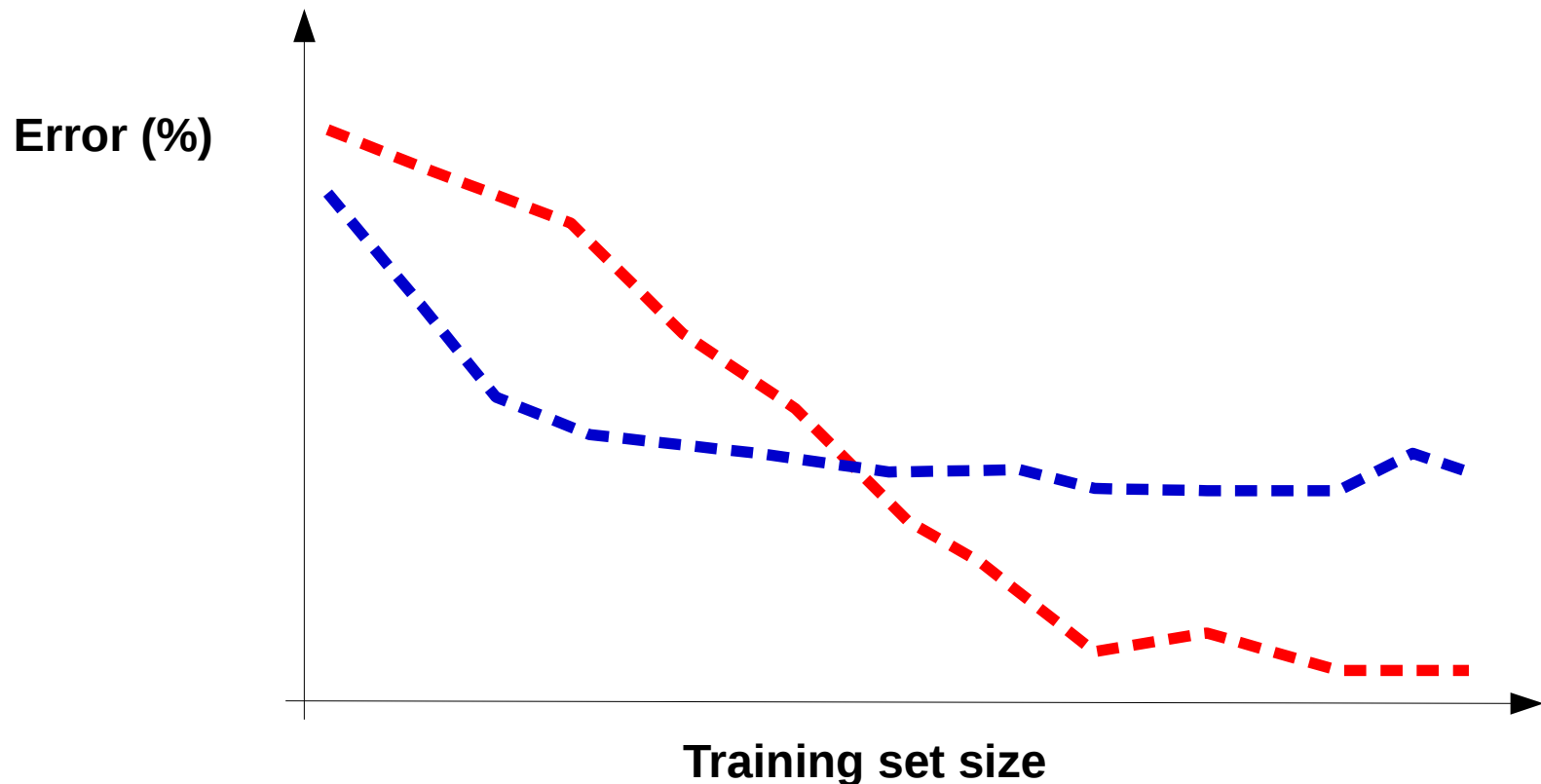
Fitting graphs

- Our classification method produces the following fitting graph. What can we conclude about the model and/or the dataset?



Learning curves

- Two classification methods produce the following learning curves. What can we conclude about them?



Expected value of classifiers

- The quality check section of a toy factory wants to build a classifier to decide, for each toy produced, whether it is faulty (class=Y) or not (class=N)
 - Throwing away a toy costs \$5
 - Selling a faulty toy causes a damage to the company's image estimated around \$10 (per toy)
- How can we set up a cost matrix such that the classifier built will minimize costs ?

Expected value of classifiers

	Predicted Y	Predicted N
Faulty (Y)		
Non-faulty (N)		

Expected value of classifiers

	Predicted Y	Predicted N
Faulty (Y)	\$ 5	\$ 10
Non-faulty (N)	\$ 5	0