

# **Introduction to Support Vector Machines**

# Support Vector Machines

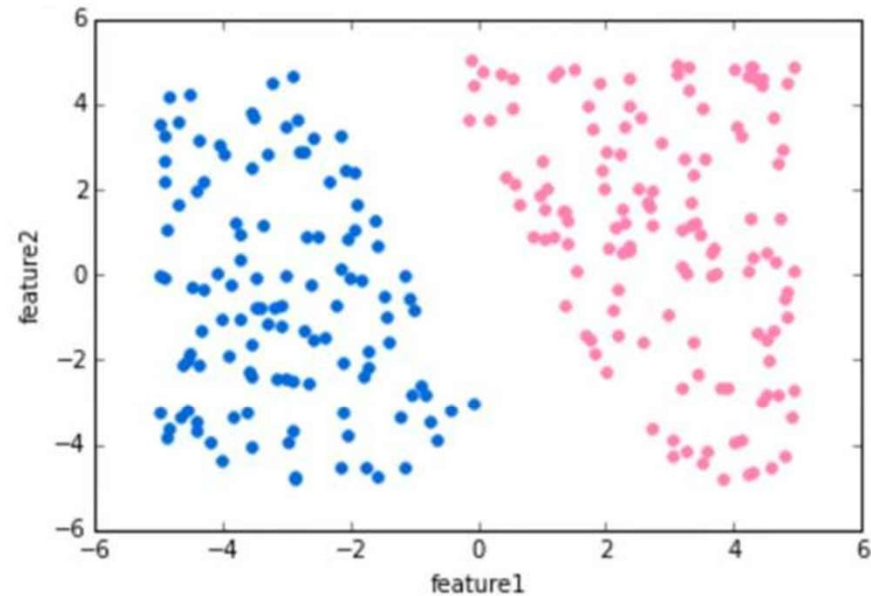
Support vector machines (SVMs) are supervised learning models with associated learning algorithms that analyze data and recognize patterns, used for classification and regression analysis.

# Support Vector Machines

Given a set of training examples, each marked for belonging to one of two categories, an SVM training algorithm builds a model that assigns new examples into one category or the other, making it a non-probabilistic binary linear classifier.

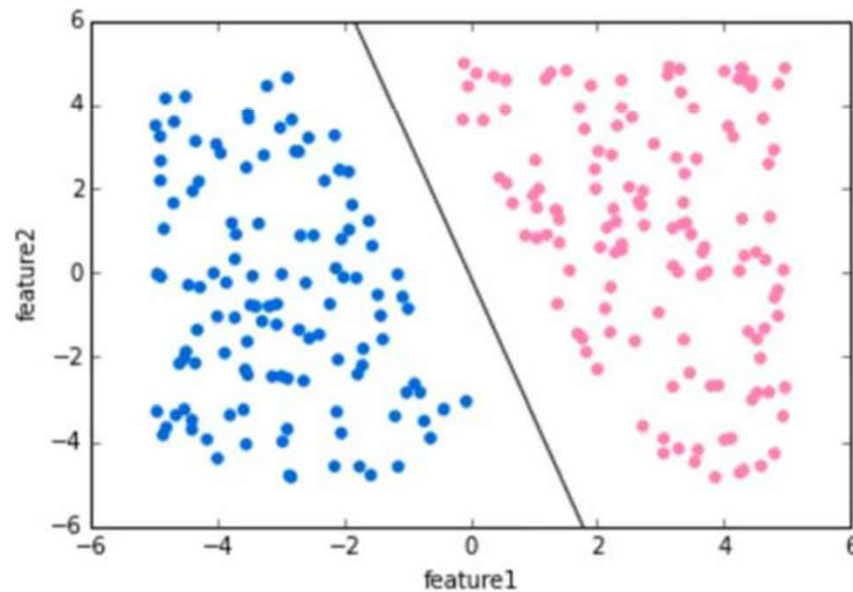
# Support Vector Machines

Let's show the basic intuition behind SVMs. Imagine the labeled training data below:



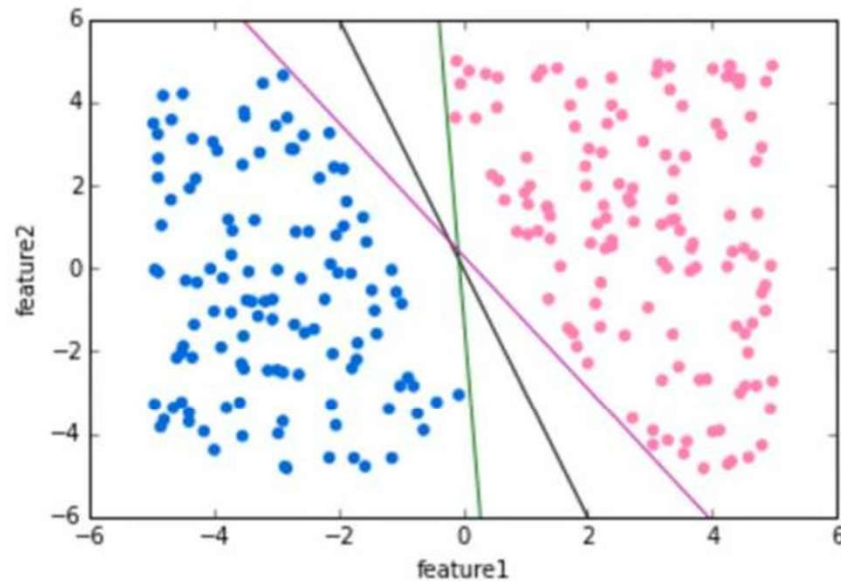
# Support Vector Machines

We can draw a separating “hyperplane” between the classes.



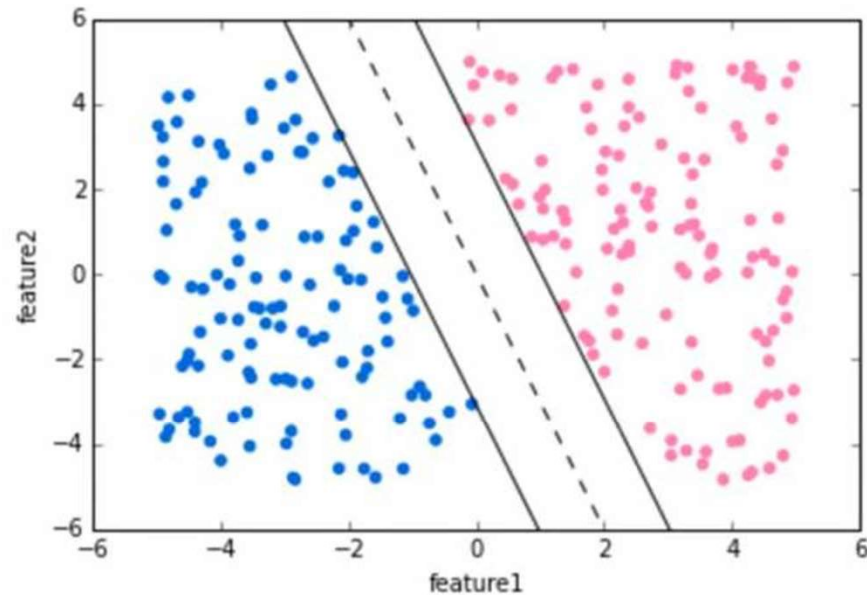
# Support Vector Machines

But we have many options of hyperplanes that separate perfectly...



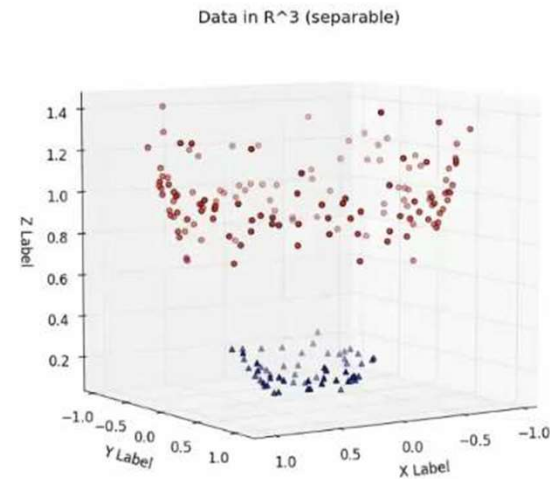
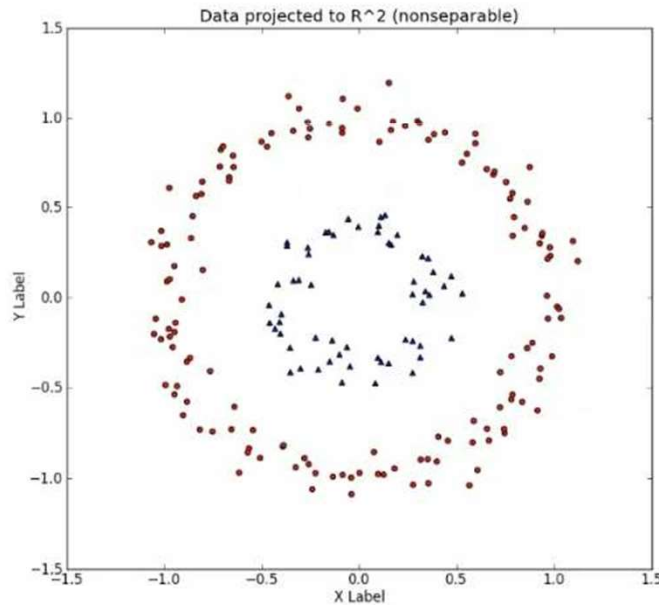
# Support Vector Machines

We would like to choose a hyperplane that maximizes the margin between classes



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We can expand this idea to non-linearly separable data through the “kernel trick”.





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Check out YouTube for nice 3D Visualization videos explaining this idea. Refer to reading for math behind this.

