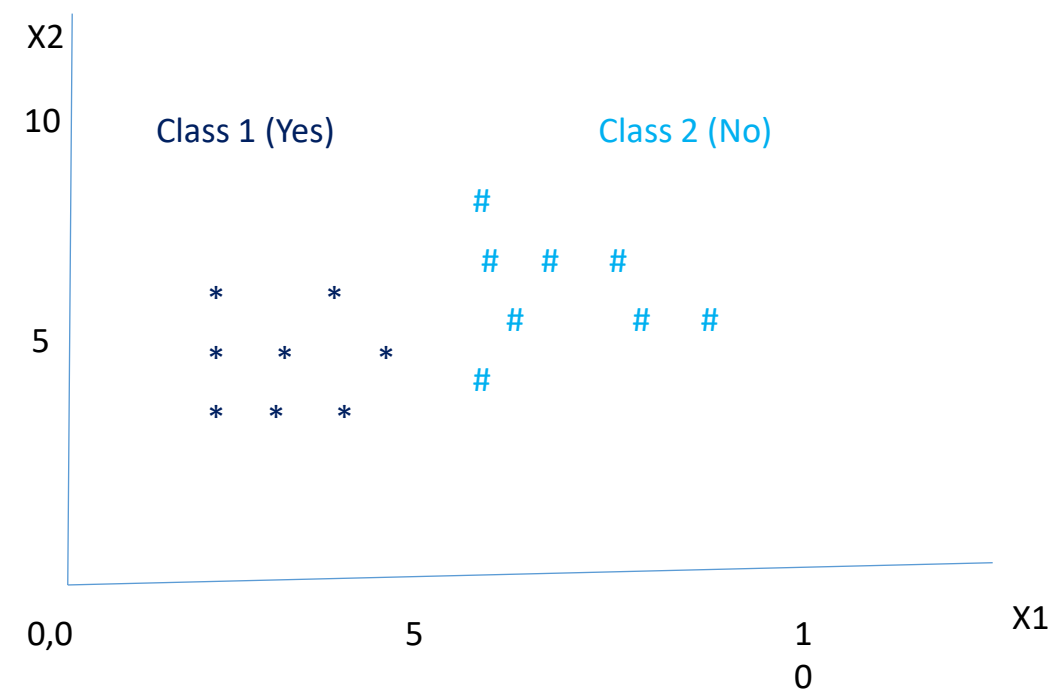


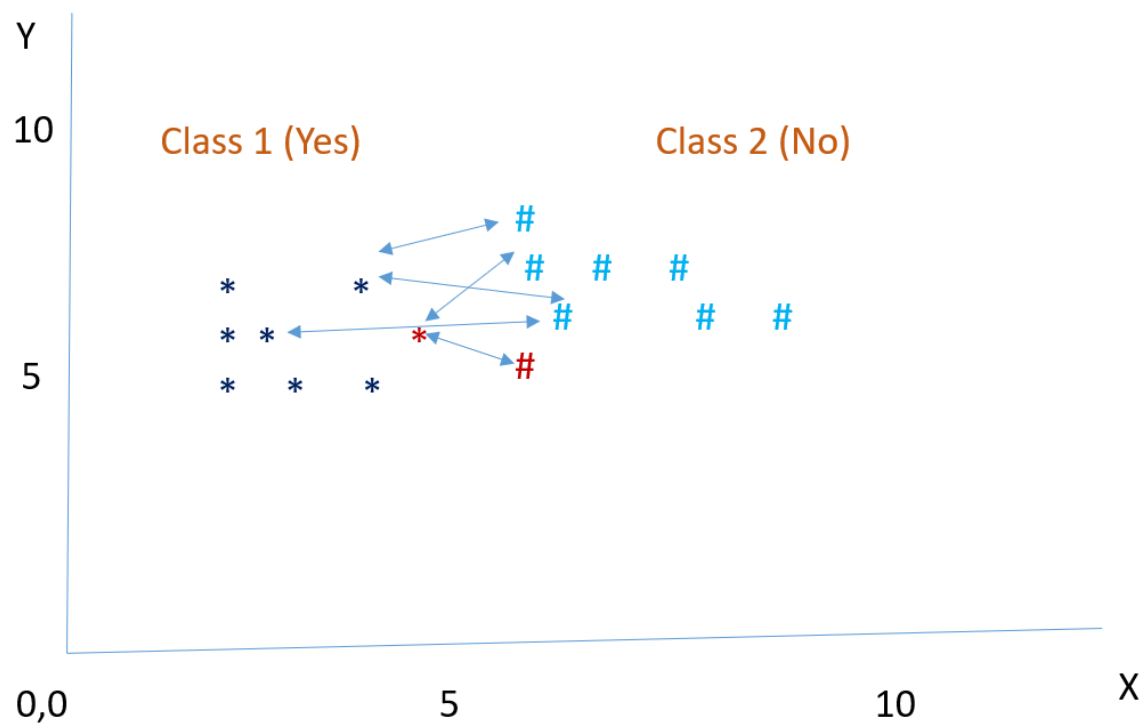


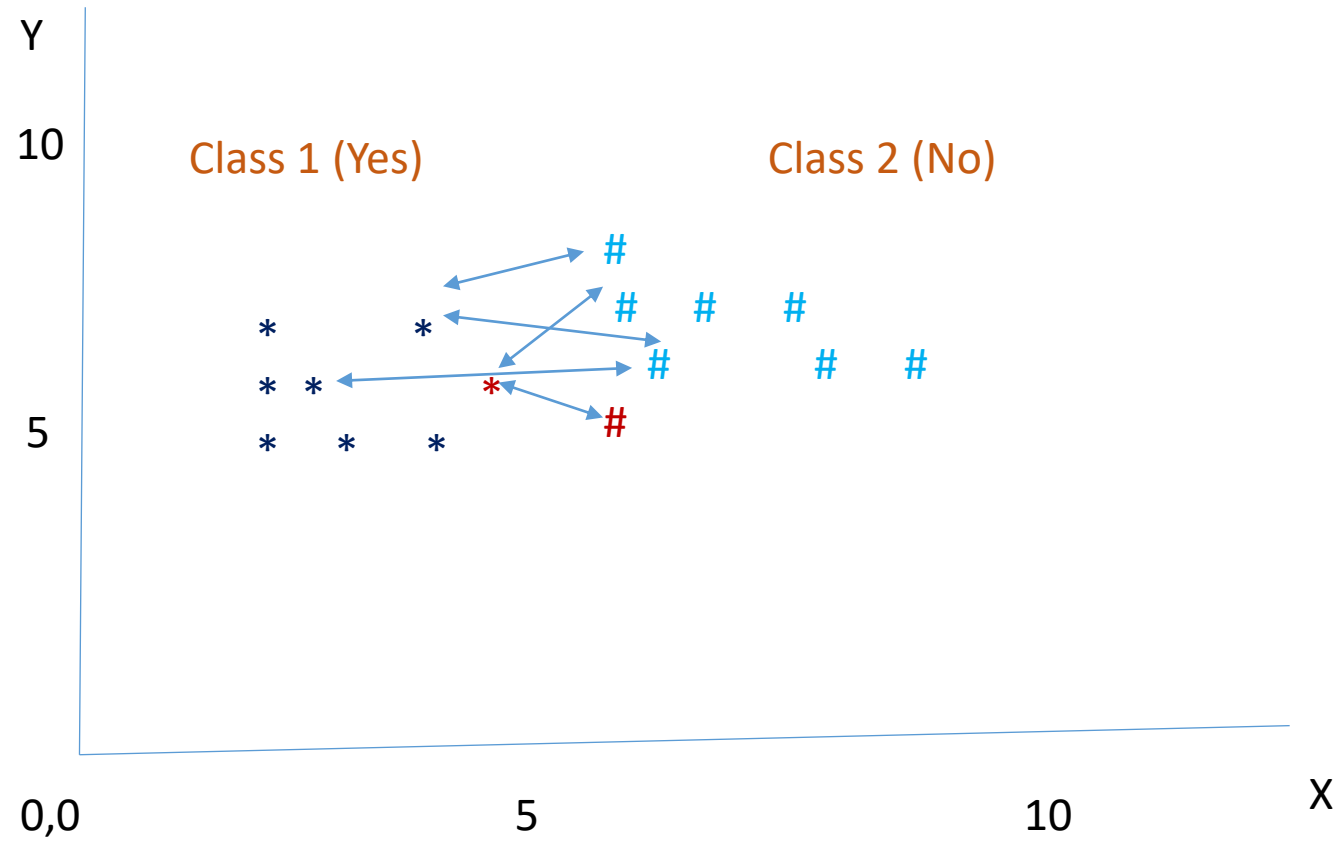
# Support Vector Machine: SVM

“Support Vector Machine” (SVM) is a supervised machine learning algorithm that can be used for both regression or classification challenges. However, it is mostly used in classification problems.

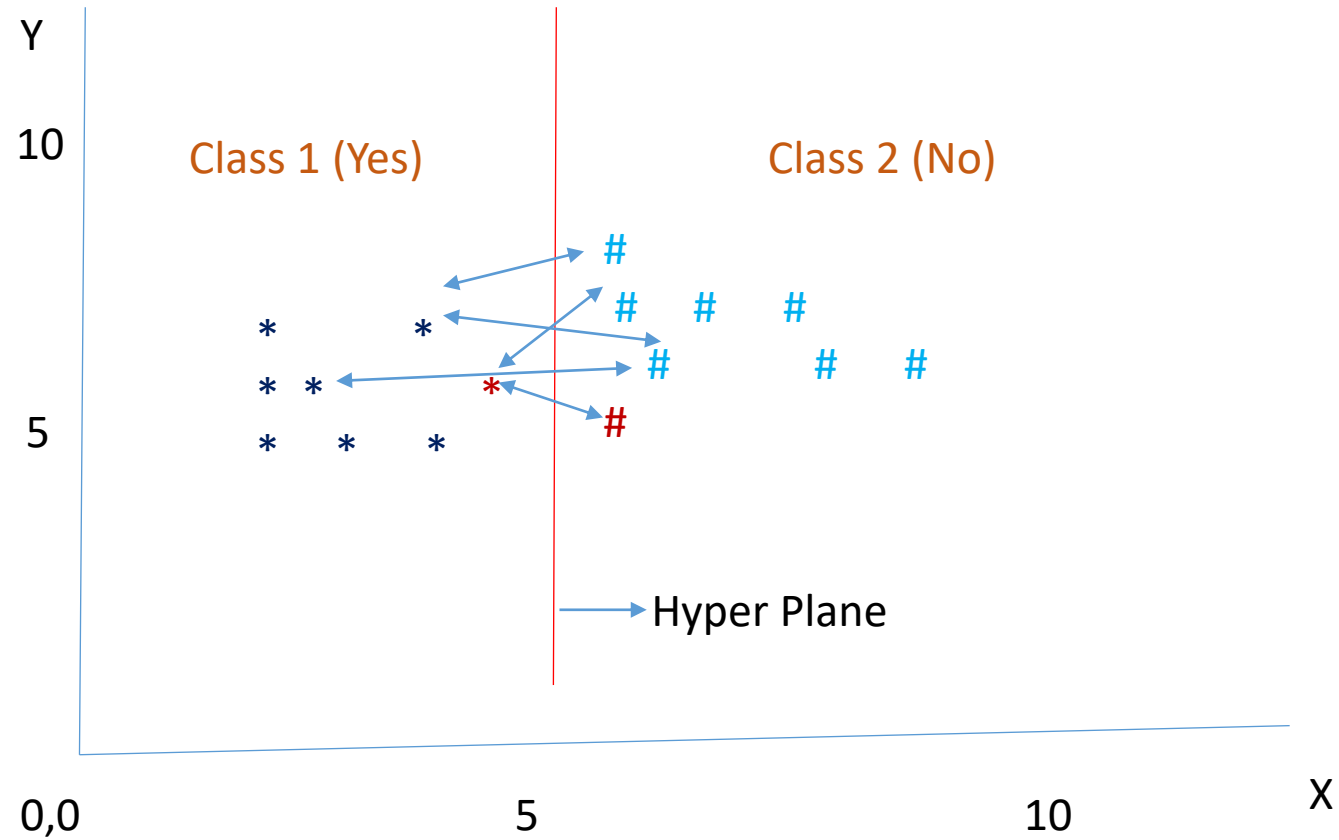
Let's see...



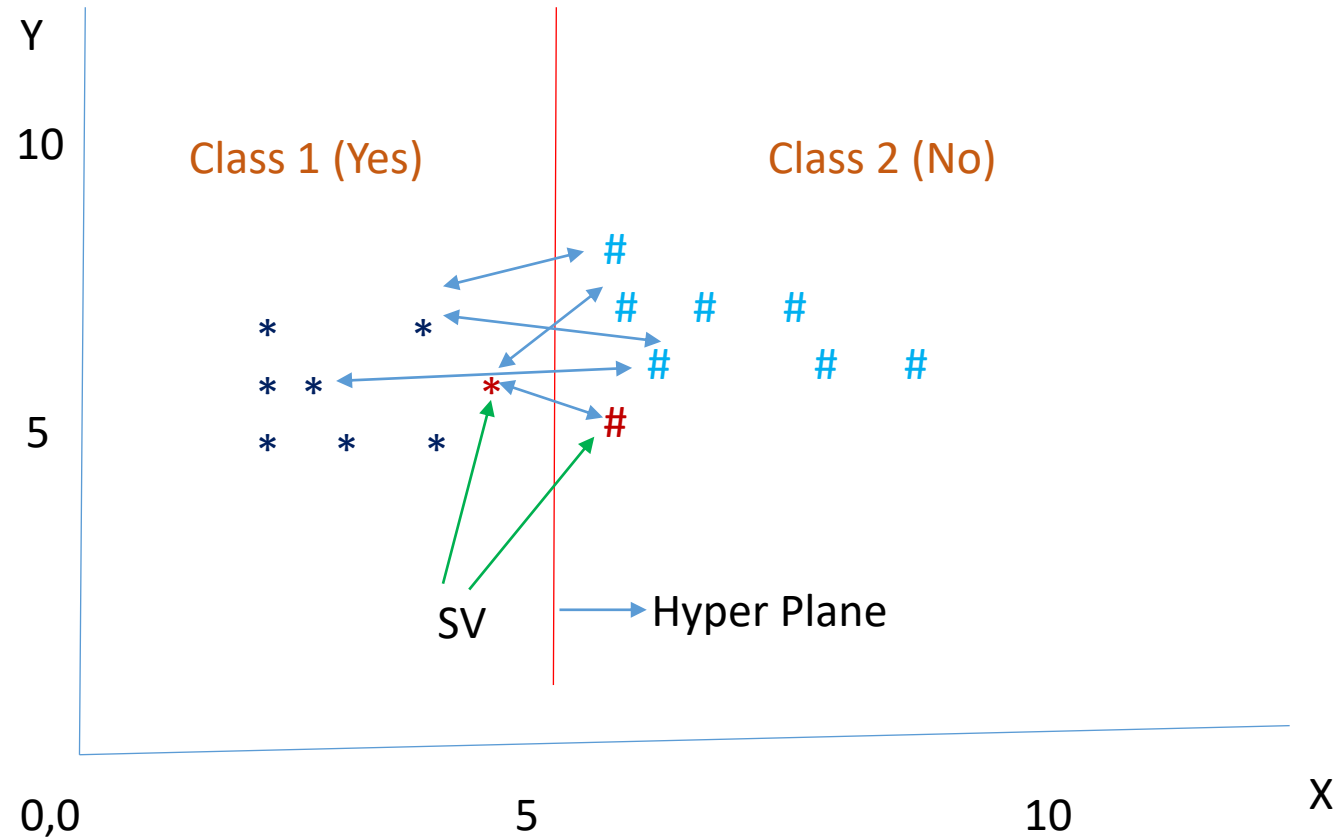




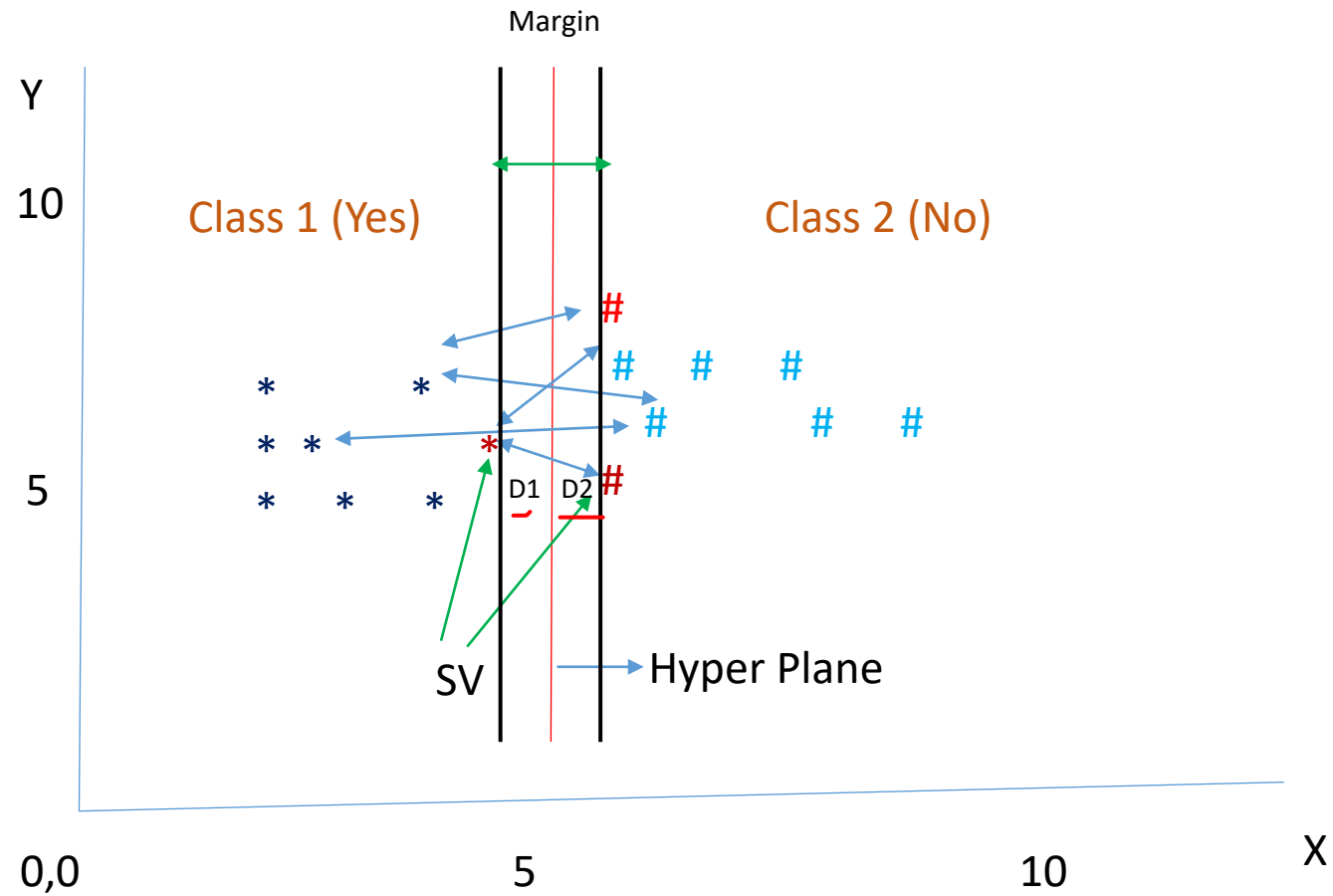
# Support Vector Machine



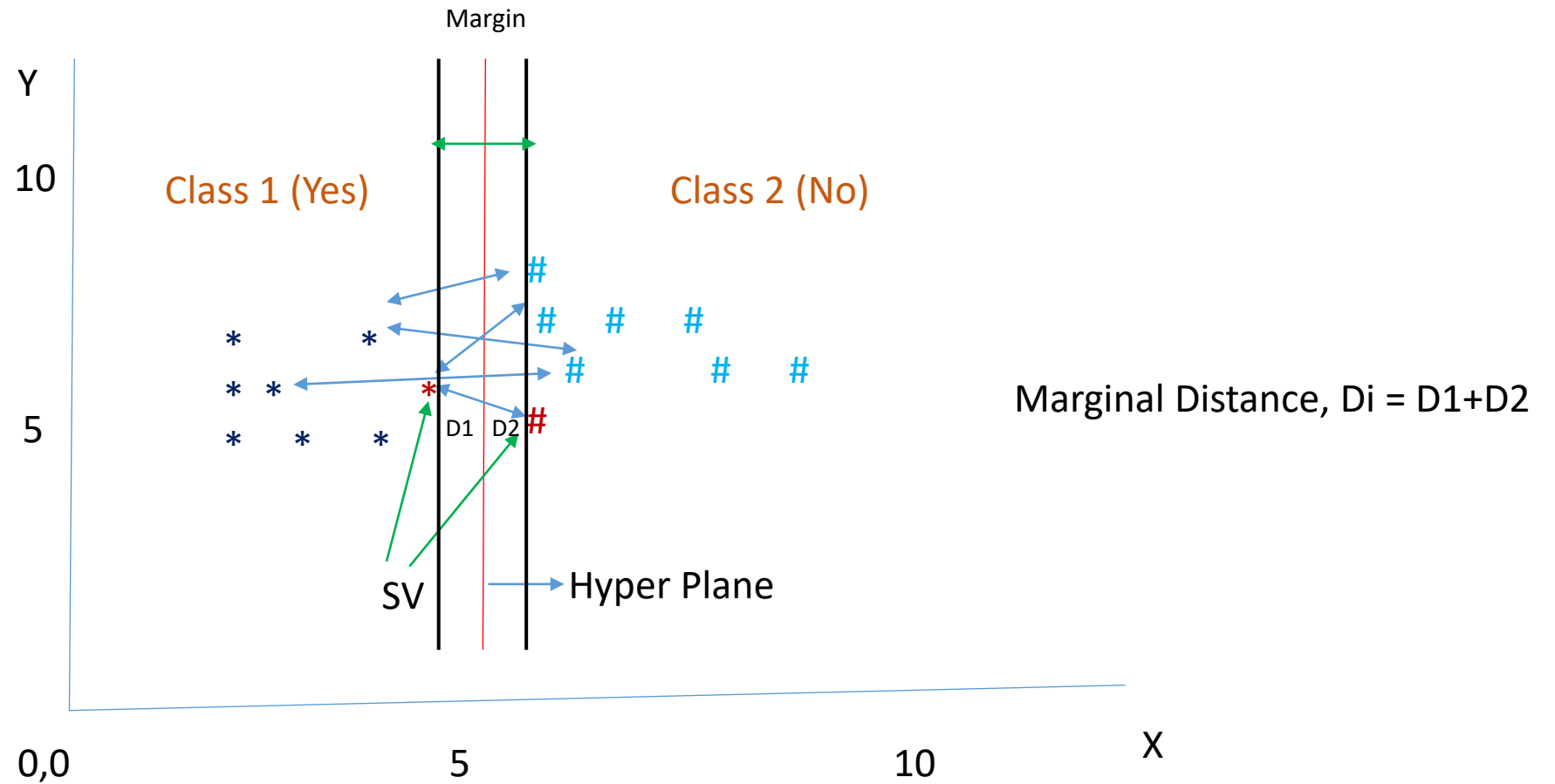
# Support Vector Machine



# Support Vector Machine

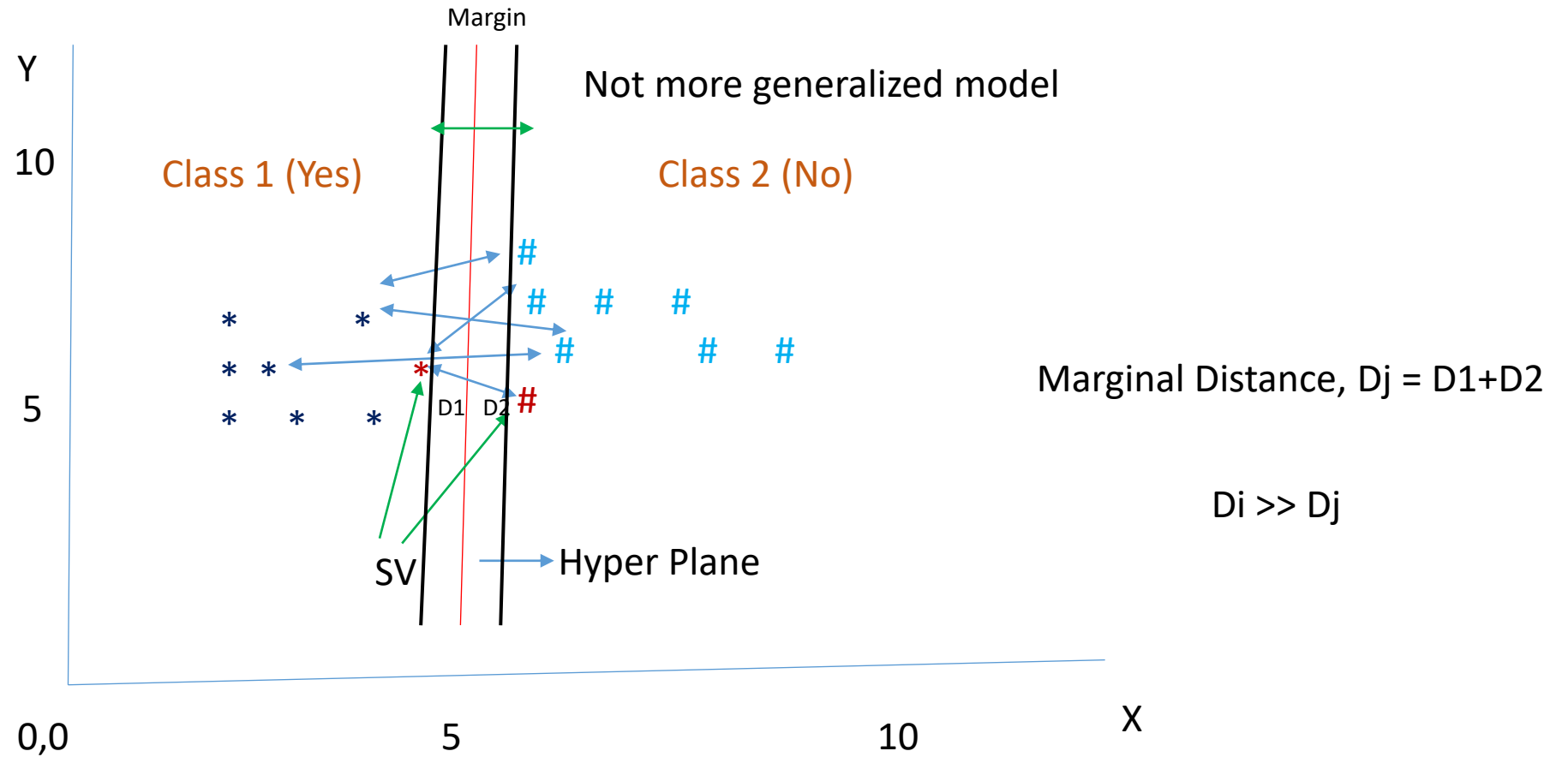


# Support Vector Machine





# Support Vector Machine

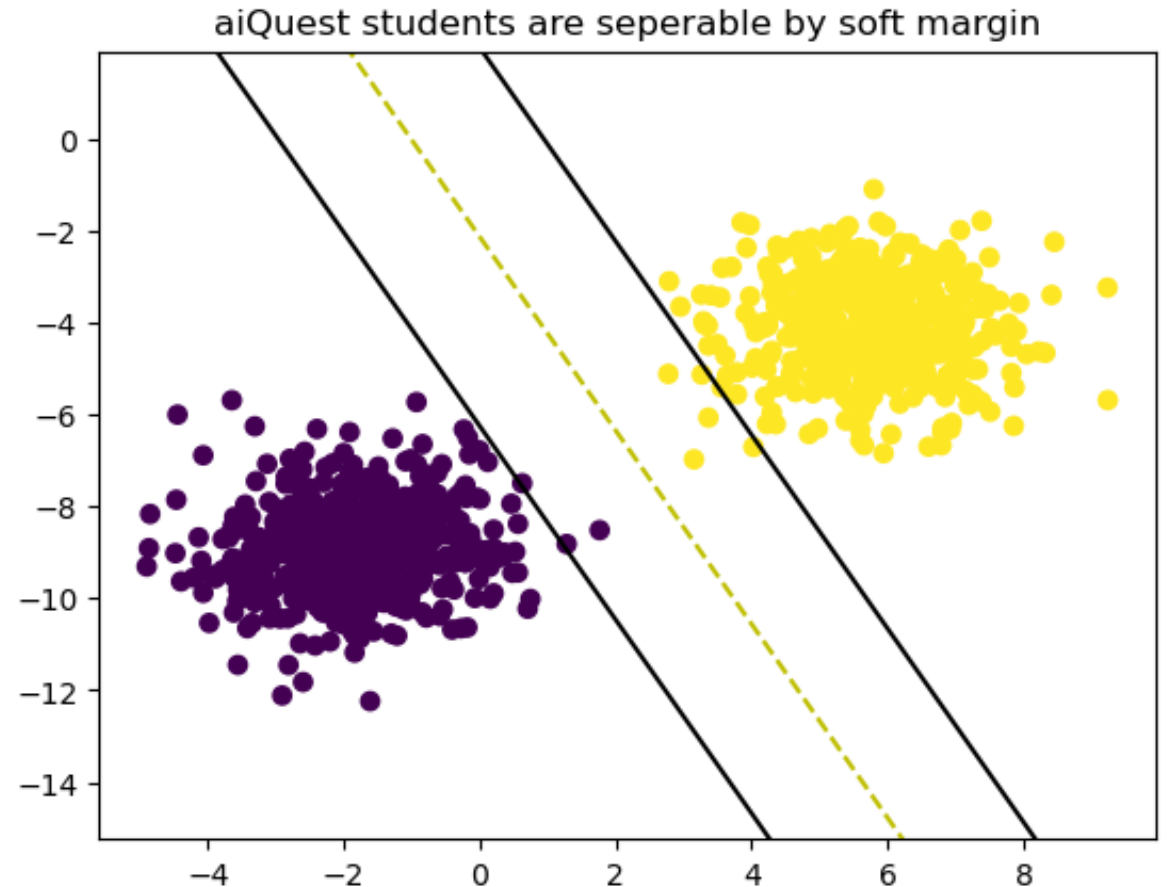


# The Role of Margins in SVMs:

Sometimes, the data is linearly separable, but the margin is so small that the model becomes prone to overfitting or being too sensitive to outliers. Also, in this case, we can opt for a larger margin by using soft margin SVM in order to help the model generalize better.

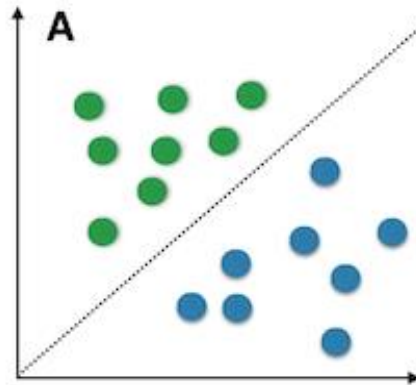
# Hard vs Soft Margin

- When the data is linearly separable, and we don't want to have any misclassifications, we use SVM with a hard margin.
- When a linear boundary is not feasible, or we want to allow some misclassifications in the hope of achieving better generality, we can opt for a soft margin for our classifier.

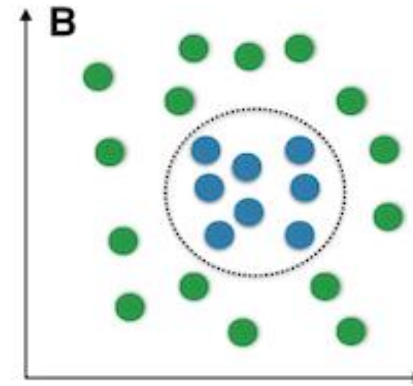


# Support Vector Machine

Linearly Separable



Non-Linearly Separable



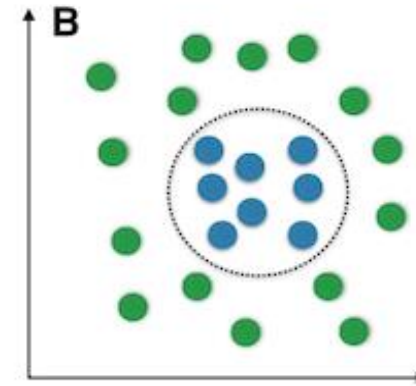
# Support Vector Machine

**SVM Kernels Trick:** Non-Linear SVM

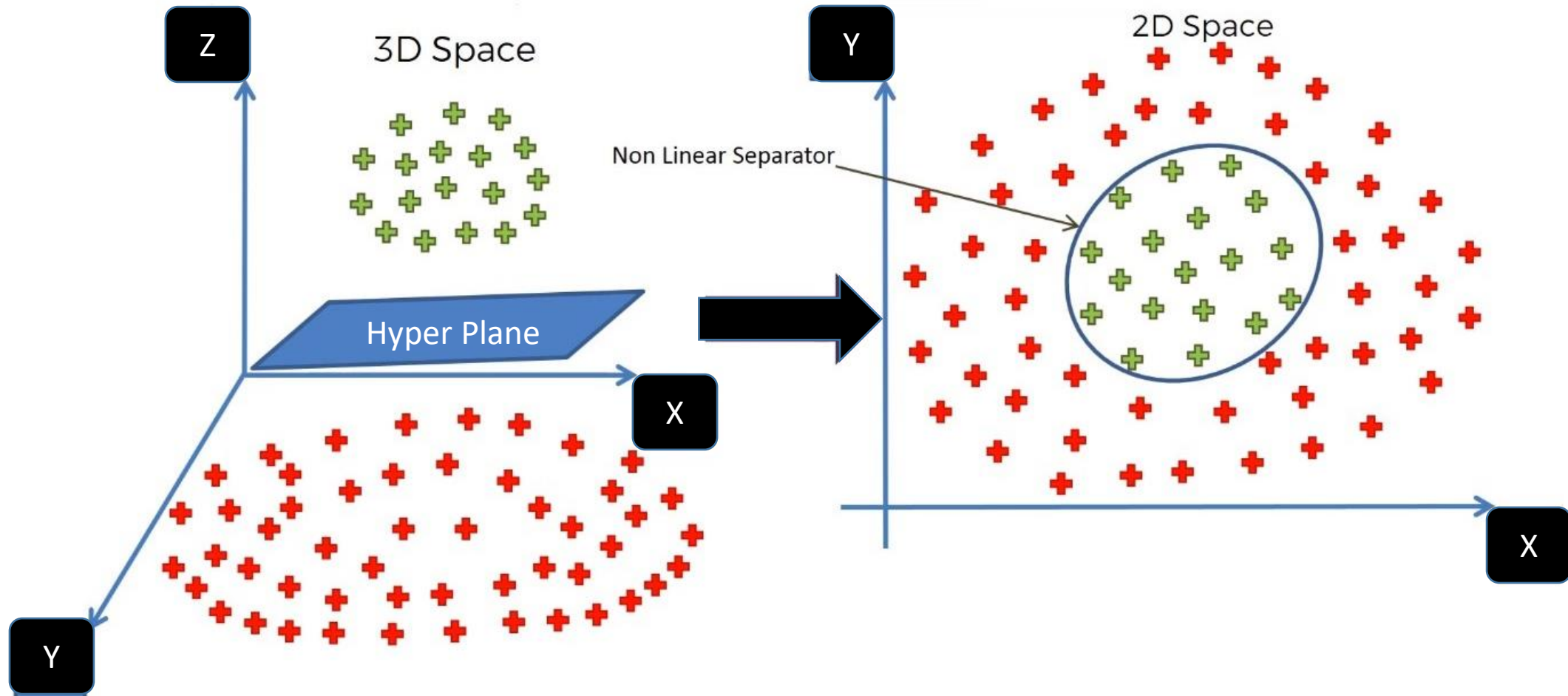
Low Dimension to High Dimensions  
2D to Higher Dimensions



Non-Linearly Separable



# Support Vector Machine



# Support Vector Machine

SVM Kernels:

- **'linear',**
- **'poly',**
- **'rbf',**
- **'sigmoid',**
- **'precomputed'**

Default : 'rbf'

