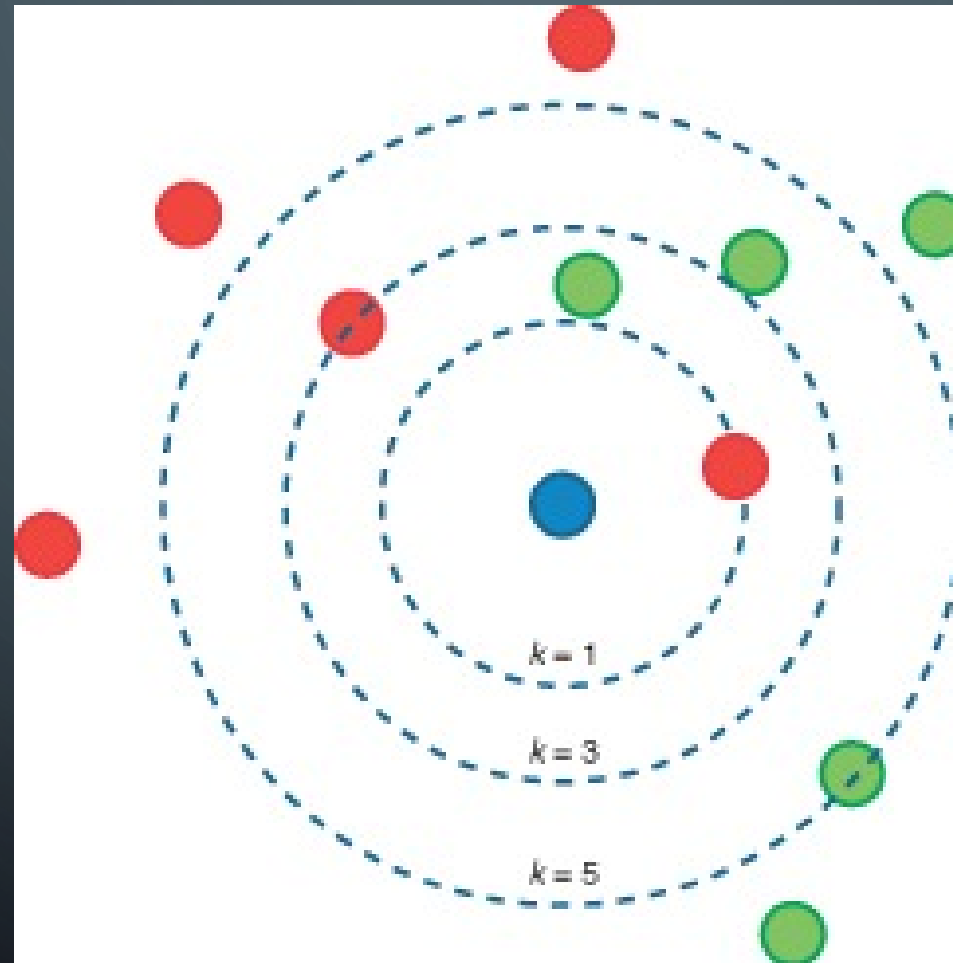




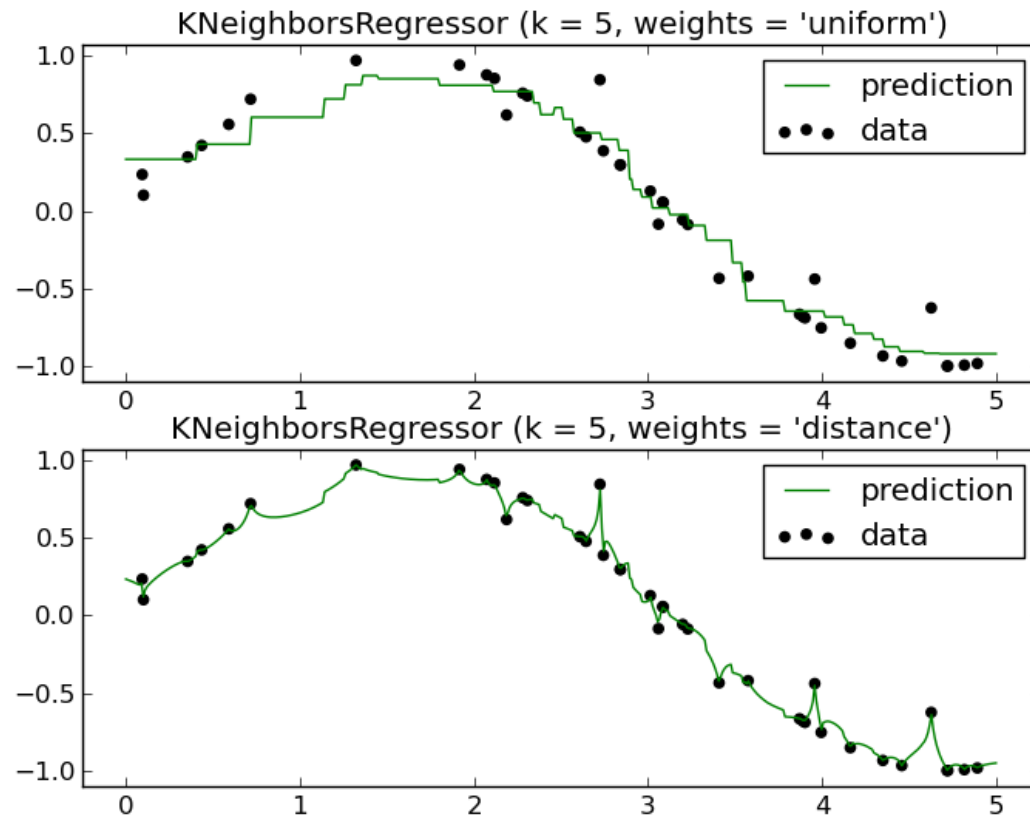
KNN

MOHAMMAD GHODDOSI

K-NEAREST NEIGHBORS CLASSIFIER



K-NEAREST NEIGHBORS REGRESSION

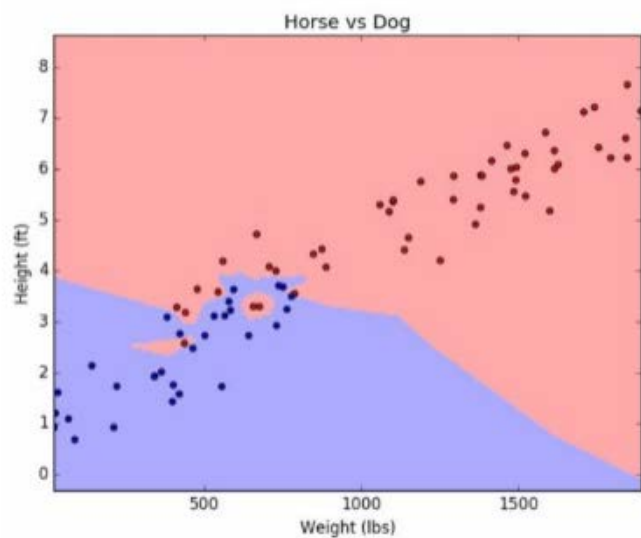


PROS AND CONS

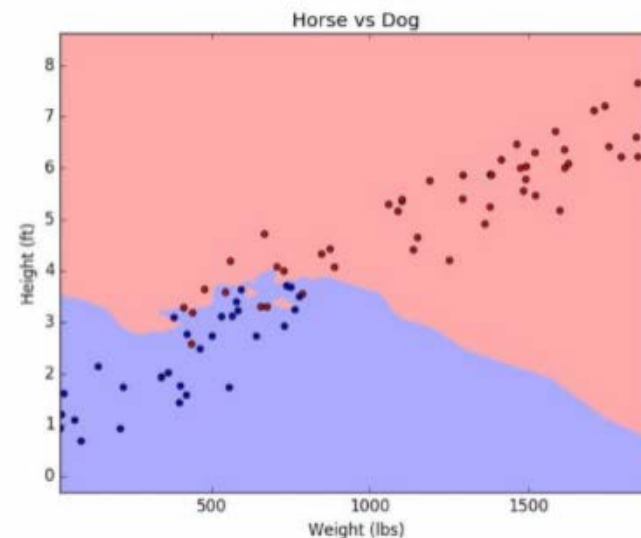
- Pros:
 - No assumptions about data
 - Simple algorithm
 - useful for classification or regression
- Cons:
 - Computationally expensive
 - High memory requirement
 - Stores all of the training data
 - Prediction stage might be slow
 - Sensitive to irrelevant features and the scale of the data

K

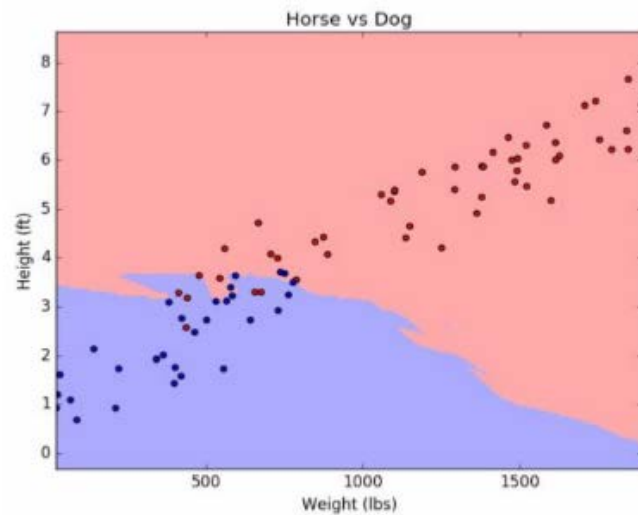
k=1



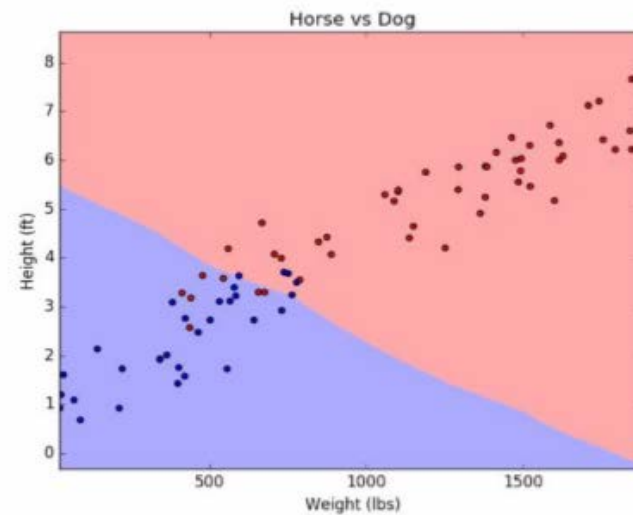
k=5



k=10



k=50



The Jupyter logo is centered in the image. It consists of two thick, orange, curved lines that form a partial circle around the word "jupyter". There are four white circles of varying sizes positioned around the logo: one at the top left, one at the top right, one at the bottom left, and one at the bottom right. The word "jupyter" is written in a white, lowercase, sans-serif font.

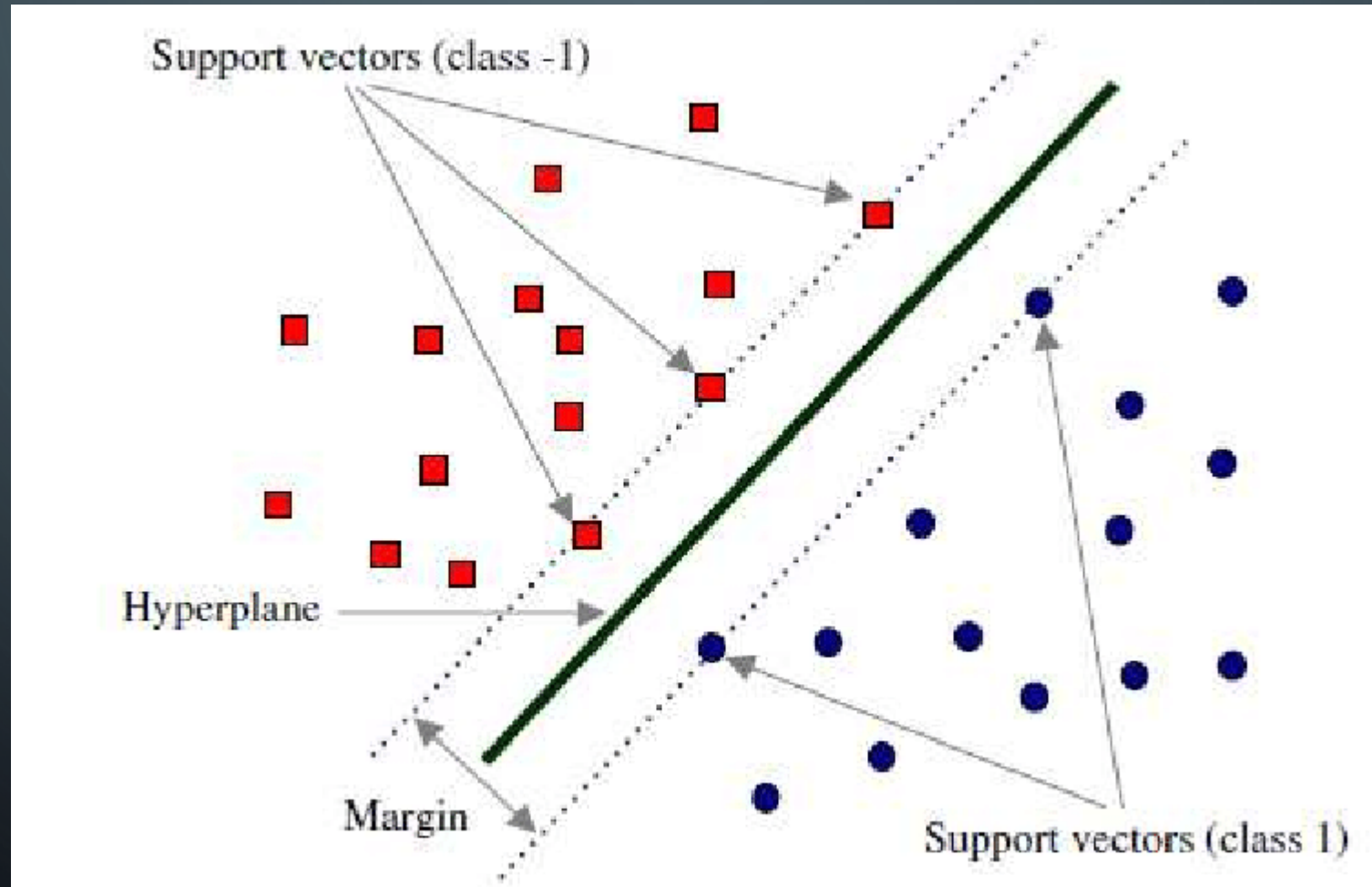
jupyter



SVM

MOHAMMAD GHODDOSI

SUPPORT VECTOR MACHINE (SVM)

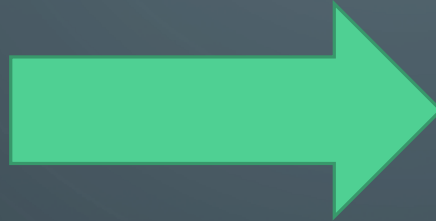


SVM (MATH)

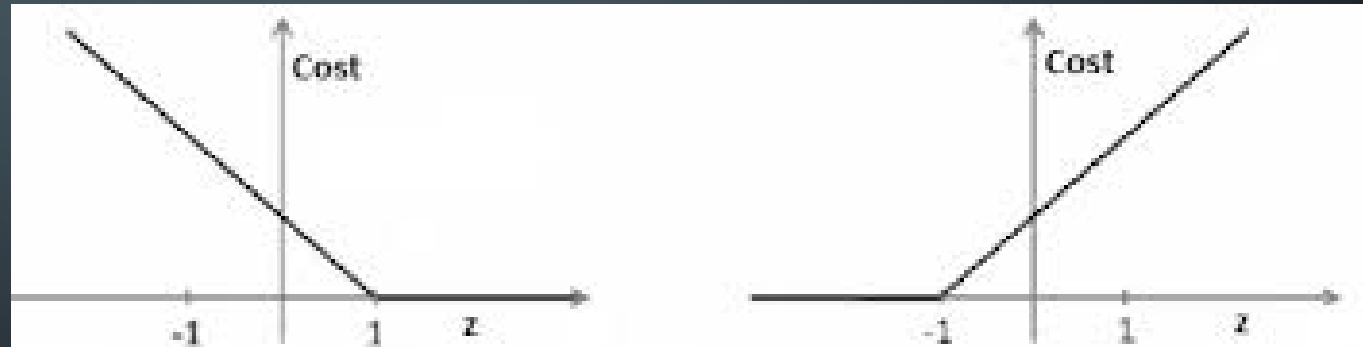
$$\min_W \frac{1}{2} \sum_{j=1}^M w_j^2$$

s. t.

$$\begin{cases} x^{(i)} \cdot W^T > 1 & \text{if } y^{(i)} = 1 \\ x^{(i)} \cdot W^T < -1 & \text{if } y^{(i)} = -1 \end{cases}$$



$$\min_W C \sum_{i=1}^N [y^{(i)} \text{cost}_1(h) + (1 - y^{(i)}) \text{cost}_2(h)] + \frac{1}{2} \sum_{j=1}^M w_j^2$$



If $y = 1$, we want $\theta^T x \geq 1$ (not just ≥ 0)

If $y = 0$, we want $\theta^T x \leq -1$ (not just < 0)

SVM WITH RBF KERNEL

