Collin Hay — Homework 4

2.1: Hypothesis

a.) If $y=1$, $h_\theta(x) \approx 1$, $\theta^T x \gg 0$
If $y=0$, $h_\theta(x) \approx 0$, $\theta^T x \ll 0$

b.) Predict $y=1$ when $h_\theta(x) \geq 0.5$
Predict $y=0$ when $h_\theta(x) < 0.5$

c.) If $y=1$ we want $h_\theta(x) \geq 1$
If $y=0$ we want $h_\theta(x) \leq -1$

d.) Predict $y=1$ when $h_\theta(x) \geq 1$ (framed)
Predict $y=0$ when $h_\theta(x) \leq 1$

2.2.) Kernel & Margain

a.) Some data is hard to find a linear Separable line in its original dimensions however if you artificially increase the dimensions of the data, there may be a Potential linear classifier. Once the dimension is increased, the kernel trick is a means to avoid computation in high dimensions and uses pairwise Similarity.

b.) A large margain prevents over fitting for outliers

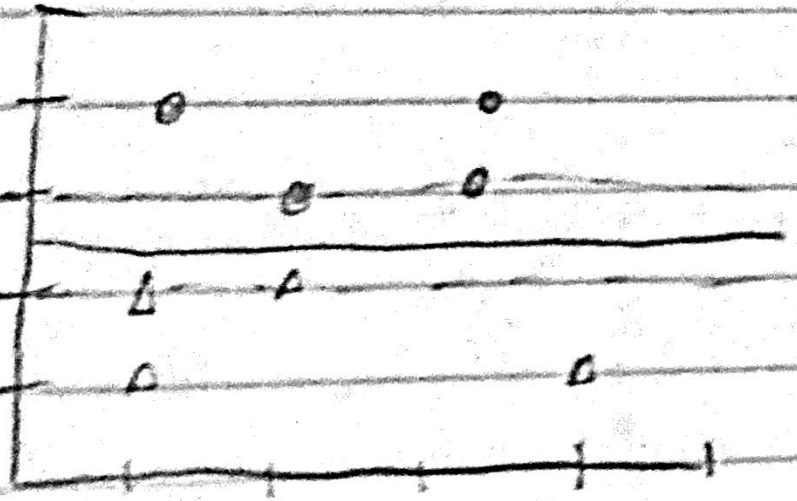
2.3.) Kernel SVM

a.) The main Parameters are the kernel width σ and the Penalty Parameter C

b.) $\sigma \rightarrow$ too large underfitting $\rightarrow$ the larger is higher bias lower variance

$C \rightarrow$ the larger it is $\rightarrow$ underfitting, higher bias lower verrance

2.4.) Decision Boundary



Margin = $2 / \|w\| = 1$

2.5

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