Machine learning Homework- Constrained Optimisation & SVM

Abinav Ravi Venkatakrishnan - 03694216 and Abhijeet Parida - 03679676

December 1, 2018

Problem 1:

We construct the Lagrangian function as $\mathcal{L}(\theta, \alpha) = f_0(\theta) + \alpha f_1(\theta)$
forcing $\nabla_\theta \mathcal{L} = 0$. We get $\theta_1 = -\frac{1}{2\alpha}$ and $\theta_2 = \frac{\sqrt{3}}{2\alpha}$
substituting back the θ in the Lagrangian function and minimising with respect to α, we get $\alpha = \pm\frac{1}{2}$ we take only the positive values of $\alpha = 1/2$.
Therefore $\theta_1 = -1$
$\theta_2 = \sqrt{3}$

Problem 2:

Problem 3:

- Both use hyperplane for classification
- SVM have margins and perceptrons do not have them

Problem 4: