Gradient Descent Homework

CMSC643

Name(s): UID(s):

1. Write the gradient of Residual Sum of Squares (RSS) loss

$$L(b, \mathbf{w}) = \frac{1}{2} \sum_{i=1}^{n} \left[y_i - (b + \mathbf{w}' \mathbf{x}_i) \right]^2$$

- 2. Write the gradient descent update equations to minimize RSS
- 3. Write the gradient of regularized RSS loss

$$L(b, \mathbf{w}) = \frac{1}{2} \sum_{i=1}^{n} \left[y_i - (b + \mathbf{w}' \mathbf{x}_i) \right]^2 + \frac{\lambda}{2} \|\mathbf{w}\|^2$$

- 4. Write the gradient descent update equations to minimize regularized RSS
- 5. Write the gradient of SVM loss (regularized hinge-loss)

$$L(b, \mathbf{w}) = \sum_{i=1}^{n} [1 - y_i(b + \mathbf{w}' \mathbf{x}_i)]_{+} + \frac{\lambda}{2} \|\mathbf{w}\|^2$$

6. Write the gradient descent update equations to fit a linear SVM (minimize regularized hinge-loss)