CS534 Implementation Assignment 1: Linear Regression, Perceptron

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Abstract

In this assignment, we implemented two versions of linear regression and perceptron, and compared their performance.

1 Introduction

We implemented linear regression to solve the regression problem. Two versions were implemented and compared for performance: batch gradient descent and stochastic gradient descent. We also implemented two different versions of perceptron to solve the binary classification problem: batch perceptron and voted perceptron. Voted perceptron provides better behavior for the non-linearly separable case of training data.

2 Linear Regression

This section compares the performance of our batch gradient descent and stochastic gradient descent algorithms for linear regression.

2.1 Batch Gradient Descent

(Report weight vector for each dataset, SSE for each test set, plot convergence)

2.2 Stochastic Gradient Descent

(Report weight vector for each dataset, SSE for each test set, plot convergence)

3 Perceptron

This section presents results from our batch perceptron and voted perceptron.

3.1 Batch Perceptron

(Report plot of classification error on training set, scatter plot of training data)

3.2 Voted Perceptron

(Report plot of classification error on training set, visualize decision boundary, report w_{avg})

4 Discussion

Discussion here