CSE258 Homework 1

Chenyu Huang, University of California San Diego 01/01/2014

1 Regression

Task 1 The fitted value of θ_0 and θ_1 are $[-3.91707489e+01, 2.14379786e-02]$

Task 2 Since the data entries only covers years from 1999 to 2012, We chose to represent the year value as a step function. In this representation, $[1,0,0,0,0,0,0,0,0,0,0,0,0,0]$ represents 1999, while $[0,0,0,0,0,0,0,0,0,0,0,0,0,1]$ represents 2012. With this representation, the relationship between year and review can be written as:

$$review/overall \simeq \sum_{i=0}^{13} \theta_i \times year[i] \tag{1}$$

$$where\ year[i]\ represent\ the\ ith\ digit\ of\ the\ year\ representation \tag{2}$$

The MSE in part 1 of the question is 0.490043819858, while the MSE using the step function representation of year value is 0.48915189521.

Task 3 The fitted coefficients are

$$\begin{bmatrix} 2.56420278e+02 \\ 1.35421303e-01 \\ -1.72994866e+00 \\ 1.02651152e-01 \\ 1.09038568e-01 \\ -2.76775152e-01 \\ 6.34332169e-03 \\ 3.85023935e-05 \\ -2.58652808e+02 \\ 1.19540565e+00 \\ 8.33006284e-01 \\ 9.79304364e-02 \end{bmatrix}$$

The MSE for the training data is 0.602307502903, while the MSE on the testing data is 0.562457127767.

Task 4 (a) The MSE for 11 ablation experiments are

$$\begin{bmatrix} 0.559113415175 \\ 0.596384849311 \\ 0.562221703459 \\ 0.55362506398 \\ 0.562629269948 \\ 0.5561408204 \\ 0.56242900712 \\ 0.544726553466 \\ 0.559566626638 \\ 0.557346348772 \\ 0.573214743821 \end{bmatrix}$$

2 Homework

Task 1 Calculate the following:

(a) $\frac{1+5i}{2-i}$

(b) $(2-3i)\cdot(4+3i)$

(c) i^{14}

(d) $\frac{1-i}{1+i}$

Task 2 This is a two part assignment:

1. If . . . then . . . is?

   (a) 1 (b) 0 (c) -1

2. If . . . then . . . ?

   (a) Yes (b) No

Task 3 As you can see on Fig. **??**. . . Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.