算法介绍

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1 Algorithm Introduction

In this project,we used five algorithms.This is the introduction to these algorithms.

1.1 The Linear Regression

Linear regression is an approach for modeling the relationship between a scalar dependent variable y and one or more explanatory variables denoted X.In this project ,linear regression fits a model with coefficents$\omega = (\omega_1, \omega_2, \cdots, \omega_p)$ to minimize the residual sum of squares between the observed responses in the dataset,and the responses predicted by the linear approximation.Mathematically,it solves a problem of the term:

$$\min_{\omega} ||X\omega - y||_2{}^2 \tag{1}$$

1.2 Ridge Regression

Ridge regression addresses some of the problems of linear regression by imposing a penalty on the size of coefficients.The ridge coefficients minmize a penalized residual sum of squares,

$$\min_{\omega} ||X\omega - y||_2{}^2 + \alpha||\omega||_2^2$$

Here,$\alpha \geq 0$is a complexity parameter that controls the amount of shrinkage:the larger value of α the greater the amount of shrinkage and thus the coefficients become more robust to collinearity.

1.3 Lasso

The Lasso is a linear model that the estimates sparse coefficients.It is useful in some contexts due to its tendency to prefer solutions with fewer parameter