Penalize Regression R Package

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JuHyun Kang

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The Three Sisters of Newton
School of Mathematics, Statistics and Data Science
Sungshin Women's University

Outline

Introduction with penalize regression

- A decision tree is a predictive model that splits the input space into regions using simple decision rules.

Penalize Regression Method

- Ridge
- Lasso
- Elastic Net
- MCP
- SCAD

Penalize Regression - Ridge

$$\frac{1}{2n}||y - X\beta|| + \lambda||\beta||_2^2$$

- Object function of ridge is strictly convex thus we can consider convex optimization problem - Ridge method has a closed form

Penalize Regression - Lasso

$$\frac{1}{2n}||y - X\beta|| + \lambda||\beta||_1$$

- Objective function of lasso is convex, not strictly convex, we can consider convex optimization problem

- But it is difficult to considered as differenitable algorithms

Penalize Regression - Elastic Net

$$\frac{1}{2n}||y - X\beta|| + \lambda_1||\beta||_1 + \lambda_2||\beta||_2^2$$

- Elastic net 은 ridge와 lasso의 penalty term을 합친 형태이다 - Objective function of elastic net is convex, ..내용 추가

Penalize Regression - Minimax Concave Penalty (MCP)

- A decision tree is a predictive model that splits the input space into regions using simple decision rules.

Penalize Regression - Smoothing Clipped Absolute Deviation (SCAD)

- A decision tree is a predictive model that splits the input space into regions using simple decision rules.

Outline

Coordinate Descent Algorithm (CDA)

- A decision tree is a predictive model that splits the input space into regions using simple decision rules.

Fast Iterative Soft-Thresholding Algorithm (FISTA)

- A decision tree is a predictive model that splits the input space into regions using simple decision rules.

Newton-Raphson Algorithm (NR)

- A decision tree is a predictive model that splits the input space into regions using simple decision rules.

Outline

Functions

```
sq.loss <- function(y) {
  y.bar <- mean(y)
  sum((y - y.bar)^2)
}
```

- We construct the following procedure for regression, where we apply a loss measure sq.loss function to the argument branch function.

Q & A

Thank you :)