Compulsory Exercise 2: Title (give your project an informative title)

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Abstract

This is the place for your abstract (max 350 words)

Abstract

Introduction: Scope and purpose of your project

Problemstillingen vår kan være om vi kan predikere alder basert på de variablene i Heart Failure-datasettet? Er det vi skal finne ut av liksom

Descriptive data analysis/statistics

```
data <- read.csv("heart.csv")
```

Methods

```
n <- nrow(data) # Number of observations

# Indexes for the training set (70% of the data)
train_idx <- sample(1:n, size = round(0.7 * n), replace = FALSE)

# Split the data
train_data <- data[train_idx, ]
test_data <- data[-train_idx, ]
```

Multiple linear regression

Ridge/Lasso

Apply Ridge regression to the Heart dataset.

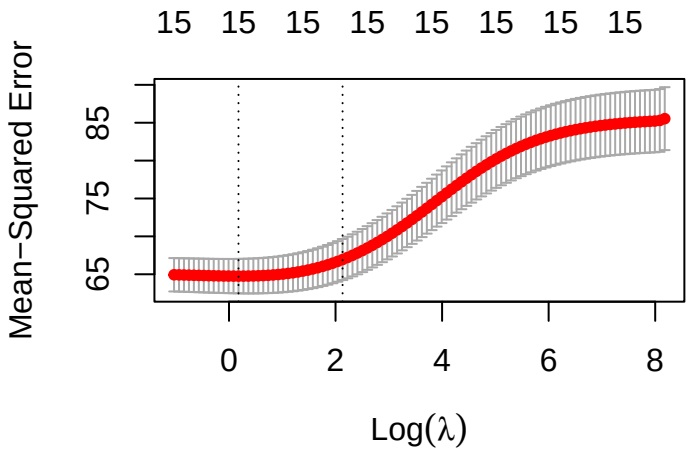
```r
library(glmnet)

# Create design matrices
x_train <- model.matrix(Age ~ ., data = train_data)[, -1]
y_train <- train_data$Age
x_test <- model.matrix(Age ~ ., data = test_data)[, -1]
y_test <- test_data$Age

# `alpha=0` is the ridge penalty
ridge_mod <- glmnet(x_train, y_train, alpha = 0)

# Cross-validation to find the best lambda
set.seed(123)
cv_ridge <- cv.glmnet(x_train, y_train, alpha = 0)

plot(cv_ridge)
```



Now, we want to find the best λ.

```r
best_lambda <- cv_ridge$lambda.min
best_lambda
```

```
## [1] 1.195248
```

Evaluate the method

```r
ridge_pred <- predict(cv_ridge, s = best_lambda, newx = x_test)
mse <- mean((y_test - ridge_pred)^2)
r2 <- 1 - sum((y_test - ridge_pred)^2) / sum((y_test - mean(y_test))^2)

cat("MSE:", mse, "\n")
```

```
## MSE: 70.9204
```

```r
cat("R²:", r2, "\n")
```

```
## R²: 0.2677013
```

Results and interpretation

Evaluere modellene på testsettet. Sammenligne metodene – hvilken ga best resultater? Diskutere hvilke variabler som har størst betydning for prediksjon av alder.

Summary