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Information

- Title: Machine Learning Regression Analysis on Hedge Fund X: Financial Modeling Challenge Data
- Name: Lily (Lizheng) Zhou

Link

- Github link: https://github.com/LilyLizhengZhou/Project_StatisticalLearning_RegressionAnalysis
- Vimeo link: https://vimeo.com/420817512

MACHINE LEARNING METHODS REGRESSION ANALYSIS ON HEDGE FUND X: FINANCIAL MODELING CHALLENGE DATA

Lily (Lizheng) Zhou

https://github.com/LilyLizhengZhou/Project_StatisticalLearning_RegressionAnalysis

https://vimeo.com/420817512

INTRODUCTION

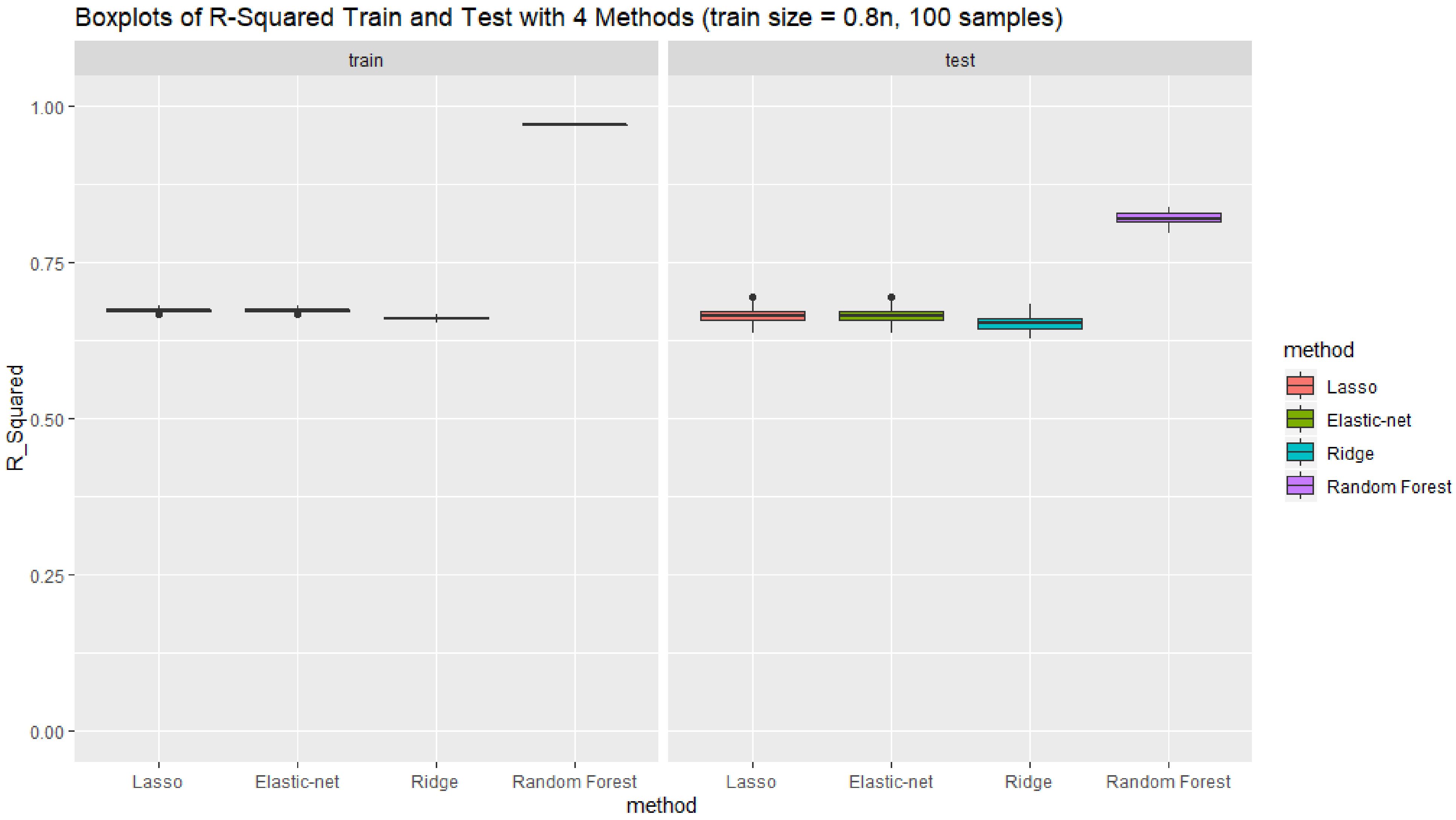
Project Description

- This project is aimed to use regression analysis to predict a numeric financial response variable based on 88 predictors with 4 methods: Lasso, Elastic-net (alpha = 0.5), Ridge and Random Forrest.

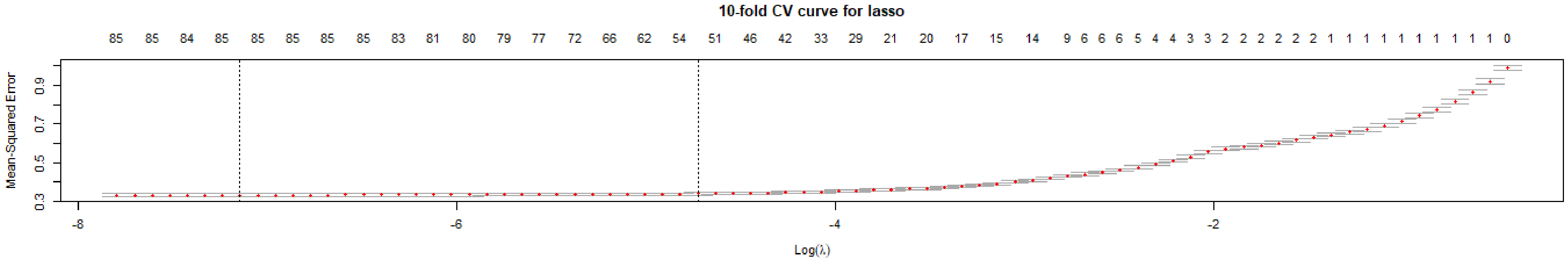
Data Description

- This dataset is a sample of the training dataset used in the DeepAnalytics competition, Hedge Fund X: Financial Modeling Challenge (https://deepanalytics.jp/compe/53).
- Data Set Structure: (n = 10000, p = 88)
  - Response variable (named as y):
    - c1: numeric
  - Predictors (named as 1 - 88):
    - c2 – c88: numeric
    - target: categorical (with levels: 0 and 1)

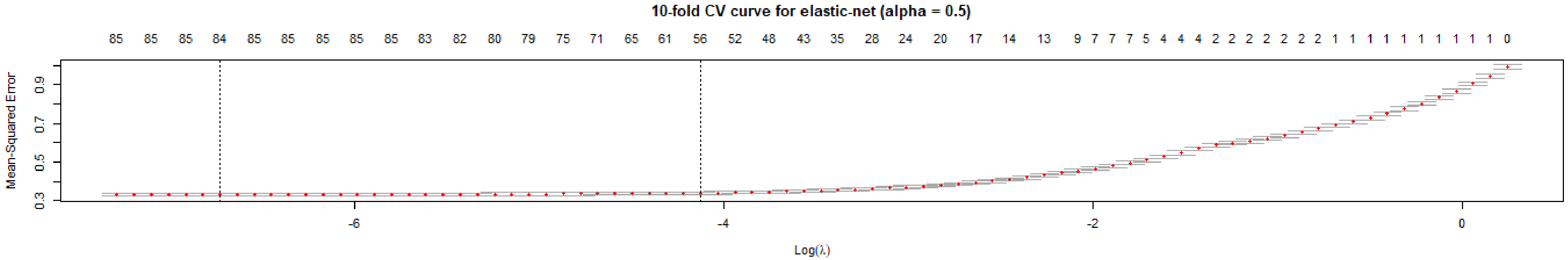
BOXPLOTS OF R-SQUARED TRAIN AND TEST



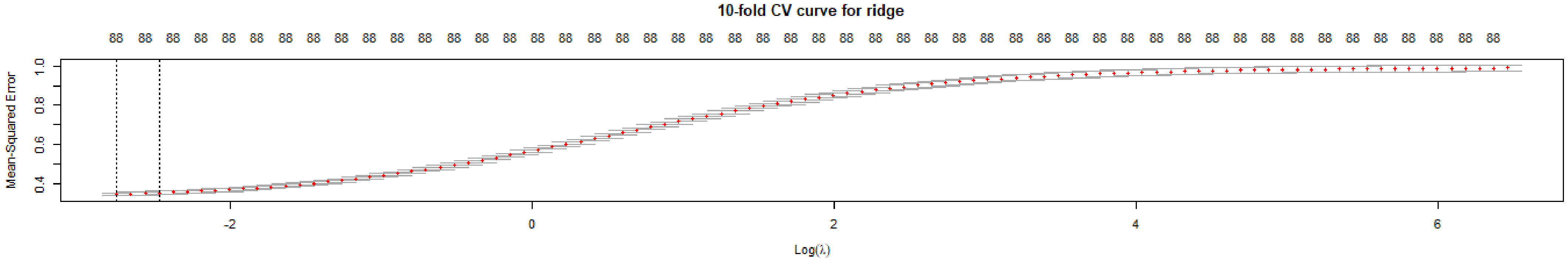
10-FOLD CV CURVES



10-fold CV curve for lasso



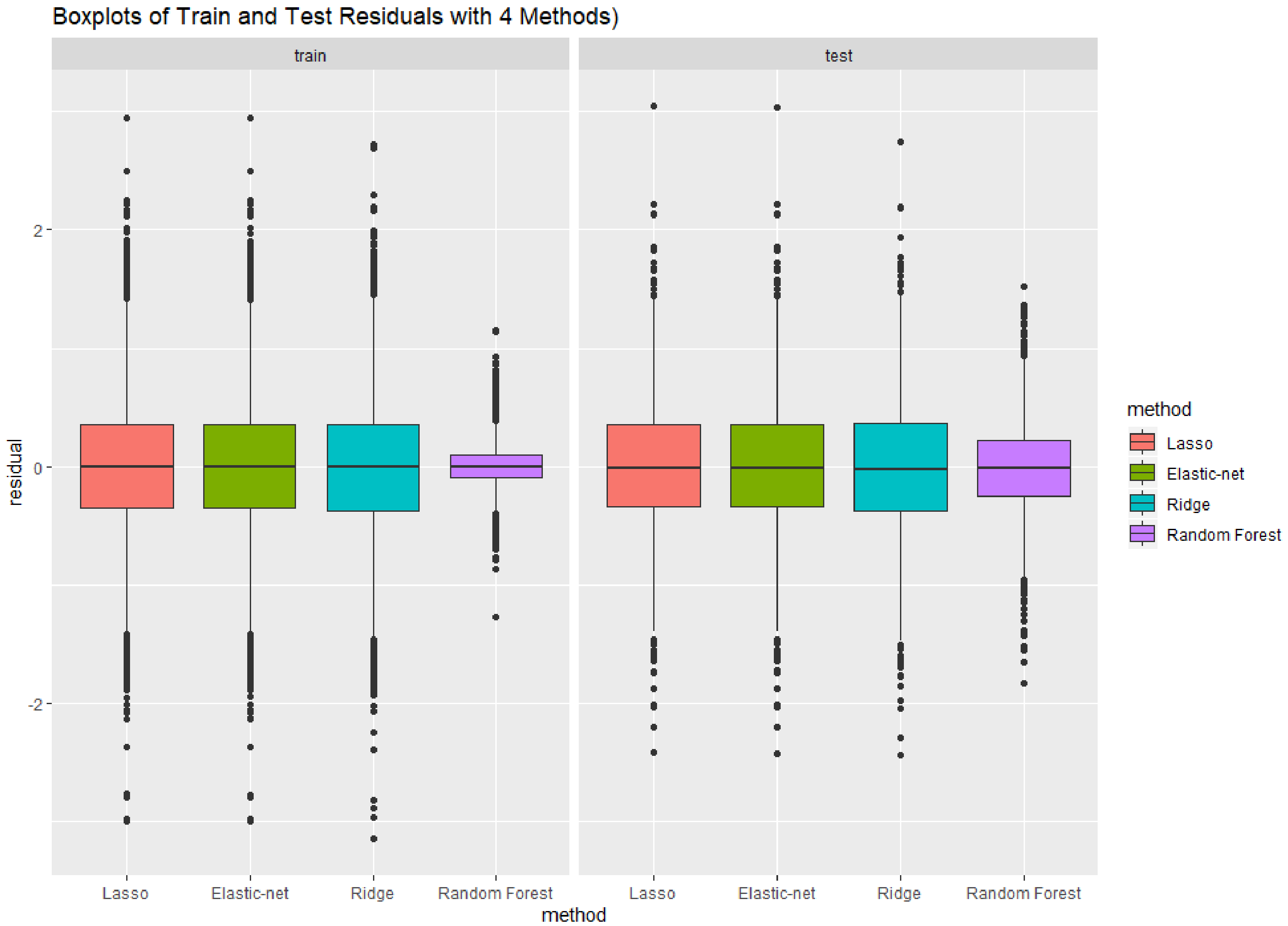
10-fold CV curve for elastic-net (alpha = 0.5)



10-fold CV curve for ridge

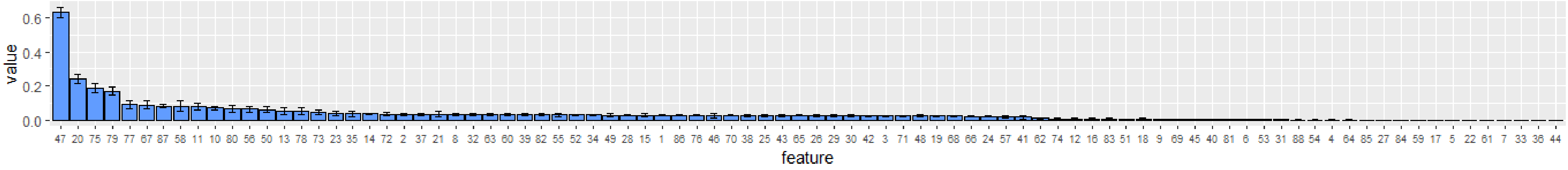
BOXPLOTS OF TRAIN AND TEST RESIDUALS

- ✓ All 4 methods' mean of residuals are very close to zero
- Lasso, Elastic-net and Ridge, their residual variance are also very close
- Random Forest has smaller variance compared to other methods; its train variance is smaller than test residuals

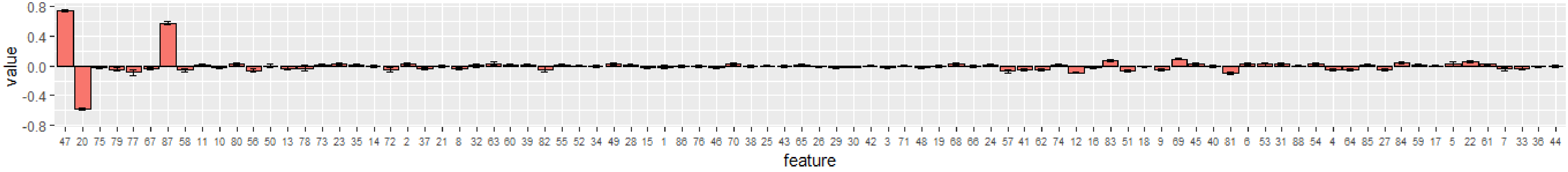

Boxplots of Train and Test Residuals with 4 Methods)

VARIABLE IMPORTANCE

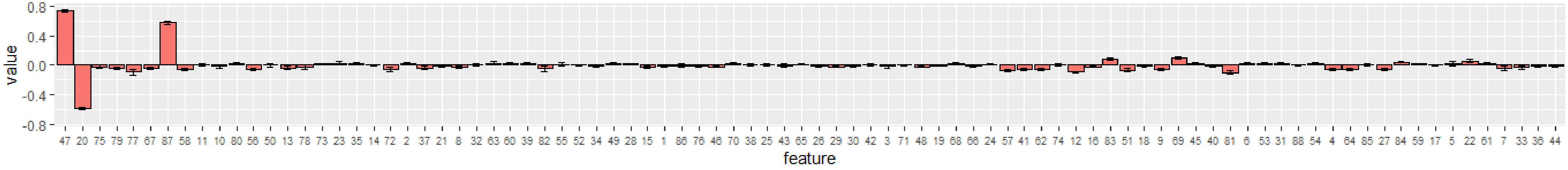
Importance of Parameters - RF



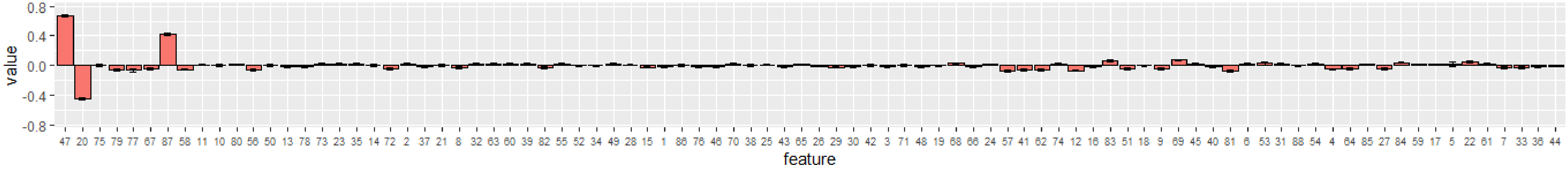
Estimated Coefficients - Lasso



Estimated Coefficients - Elastic-net (alpha = 0.5)



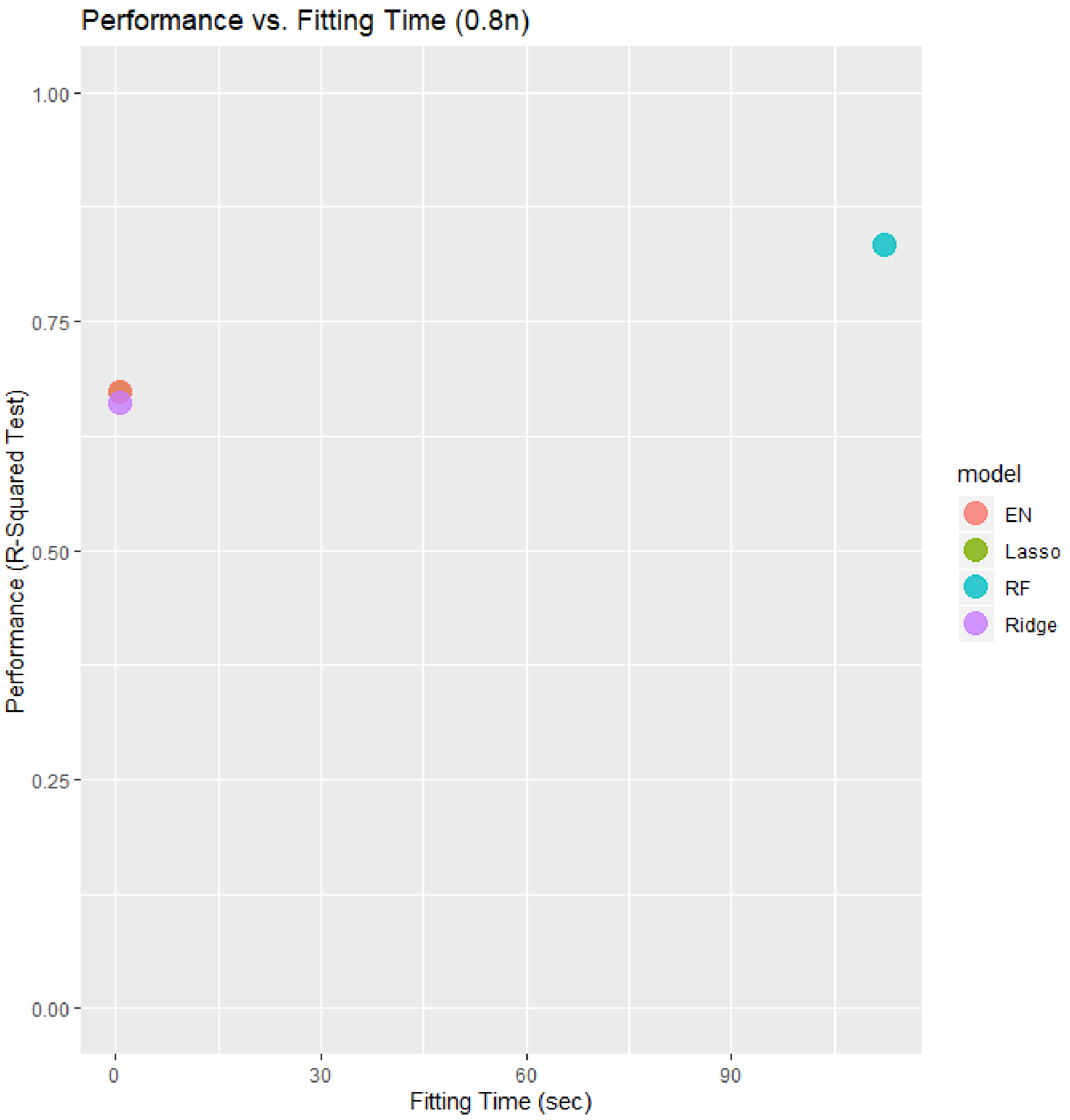
Estimated Coefficients - Ridge



PERFORMANCE VS. TIME

Model	Model Fitting Time (sec)	Model Performance (R-Squared Test)
Lasso	0.66	0.6731127
Elastic-net	0.67	0.6731972
Ridge	0.70	0.6616434
Random Forest	112.20	0.8332545

- Lasso, Elastic-net and Ridge, their performance and fitting time are very similar
- Random Forest performs decent at the cost of high time complexity



THANK YOU