What Contributes to a Better Life?

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Introduction

The data set we chose to analyze was "OECD Better Life Index," which has data containing the average score of life satisfaction across countries as well as quantitative data for other factors that might affect life satisfaction, such as homocide rates.

The question we chose to study was "What variables contribute most to quality of life?". We did this using LASSO Regression, Ridge Regression, and Partial Least Squares Regression. Our response variable was the Life Satisfaction as Average Score variable.

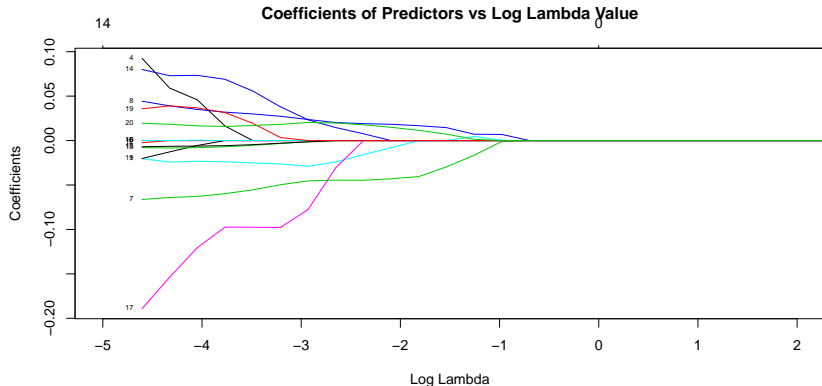Please view the data set at the following link:
https://www.kaggle.com/jej13b/oecd-better-life-index/data

LASSO

- LASSO is a statistical shrinkage method, also known as L1 Norm Regression.
- Unlike Ridge Regression, LASSO shrinks the coefficient estimates towards zero and causes some of them to be exactly equal to zero given a large enough tuning parameter.
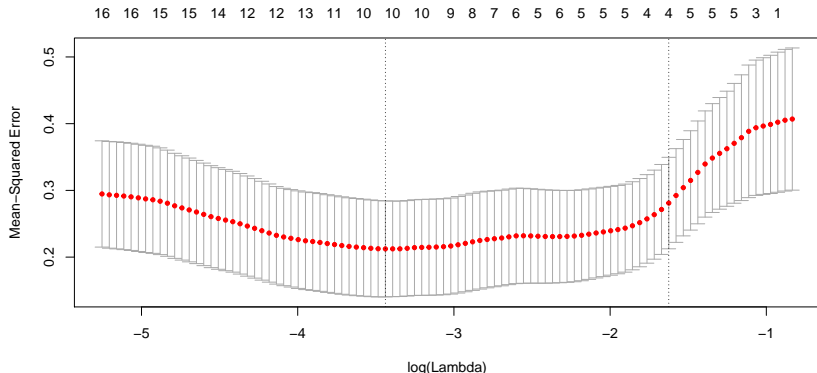
Predictor Coefficients vs Lambda Values

When lambda is very small, all the coefficients are in the model. As it grows, fewer variables are in the model (since more of the coefficients of the predictors will take on a value of zero). This plot shows the various predictor coefficients (unlabelled) over a lambda value.

Coefficients of Predictors vs Log Lambda Value

Finding the Best Lambda Value

In order to find the best lambda value, we performed 10-fold cross validation and found the lambda value that minimized the cross validation error. This lambda value ended up being 0.05355919.

Predictors

From the best lambda value, we were able to find the coefficients for the predictors are are still in the model - i.e. the predictors that didn't go to 0 during this process. See the table of them below.

Predictors	Coefficient
Housing.expenditure.as.pct	5.06e-3
Labour.market.insecurity.as.pct	-8.99e-6
Employment.rate.as.pct	1.95e-2
Long.term.unemployment.rate.as.pct	-5.76e-2
Personal.earnings.in.usd	1.20e-5
Quality.of.support.network.as.pct	2.40e-6
Years.in.education.in.yrs	4.01e-2
Self.reported.health.as.pct	2.17e-2
Homicide.rate.as.rate	7.91e-3
Time.devoted.to.leisure.and.personal.care.in.hrs	2.98e-2