

# FinalProject

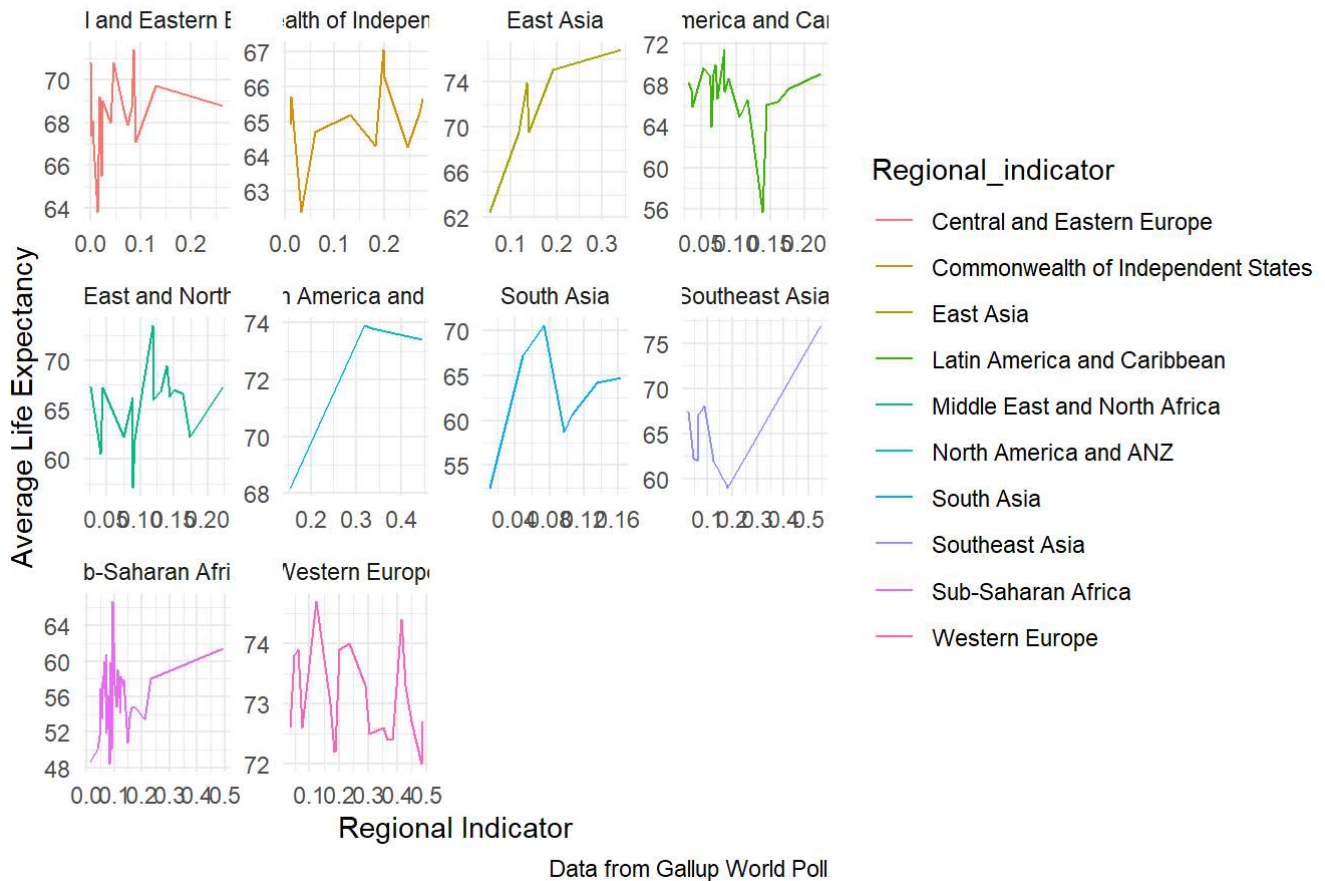
Fjolle Gjonbalaj

13/05/2021

#Healthy life expectancy based on different happiness indicators broken down by region

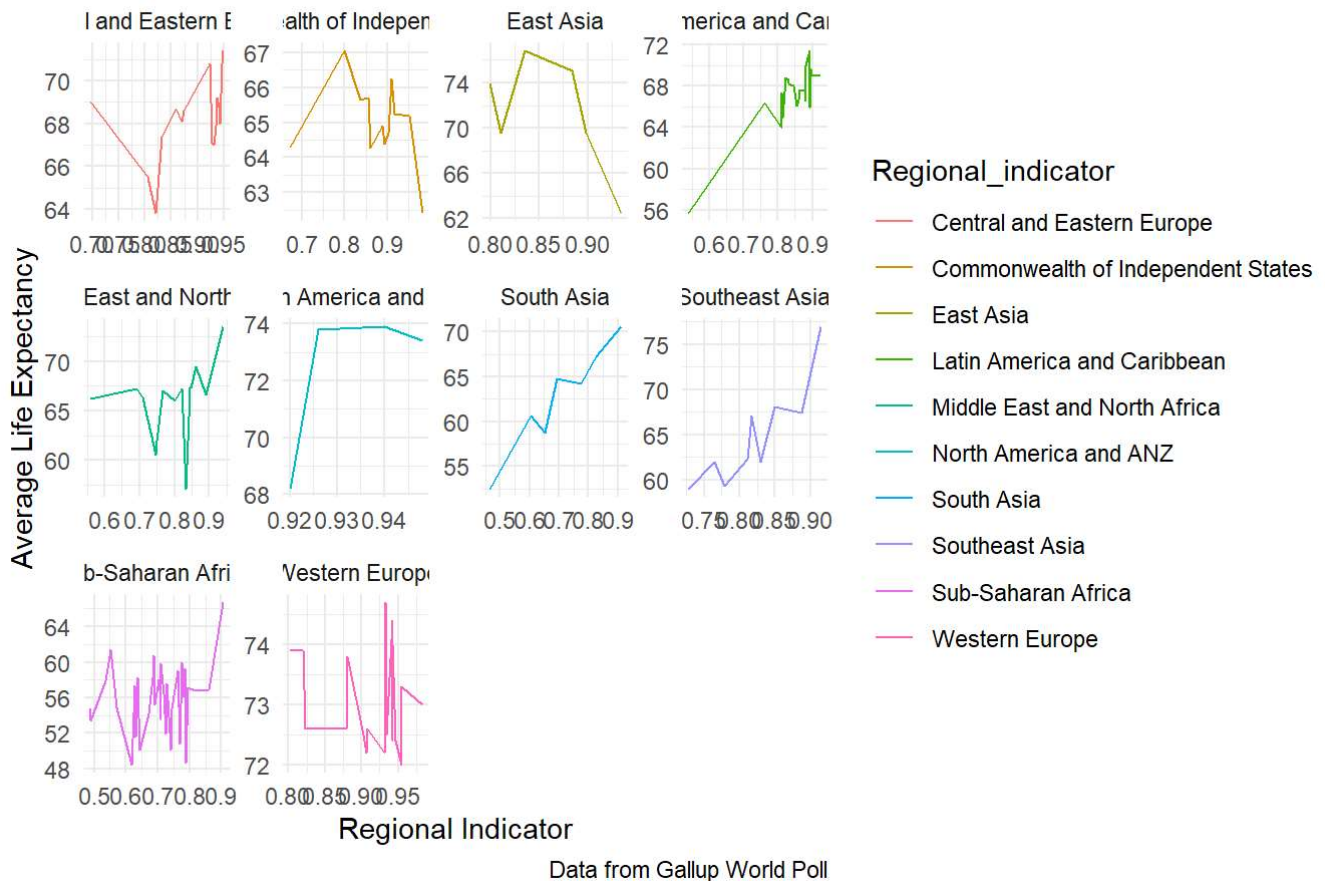
#Healthy life expectancy explained by perceptions of corruption

Figure 1: Healthy Life Expectancy based on Perception of Corruption



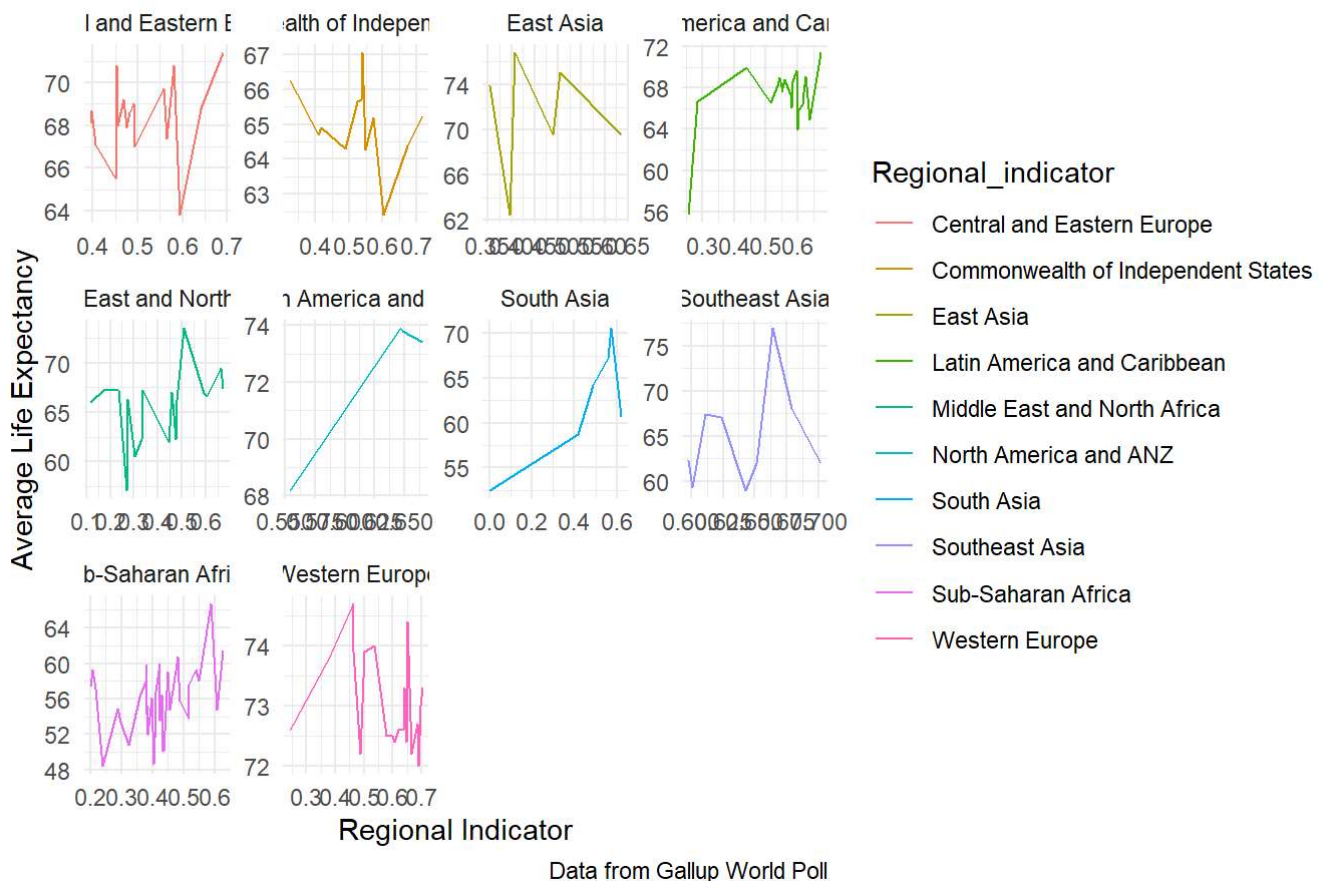
#Healthy life expectancy explained by social support

Figure 2: Healthy Life Expectancy based on Social Support



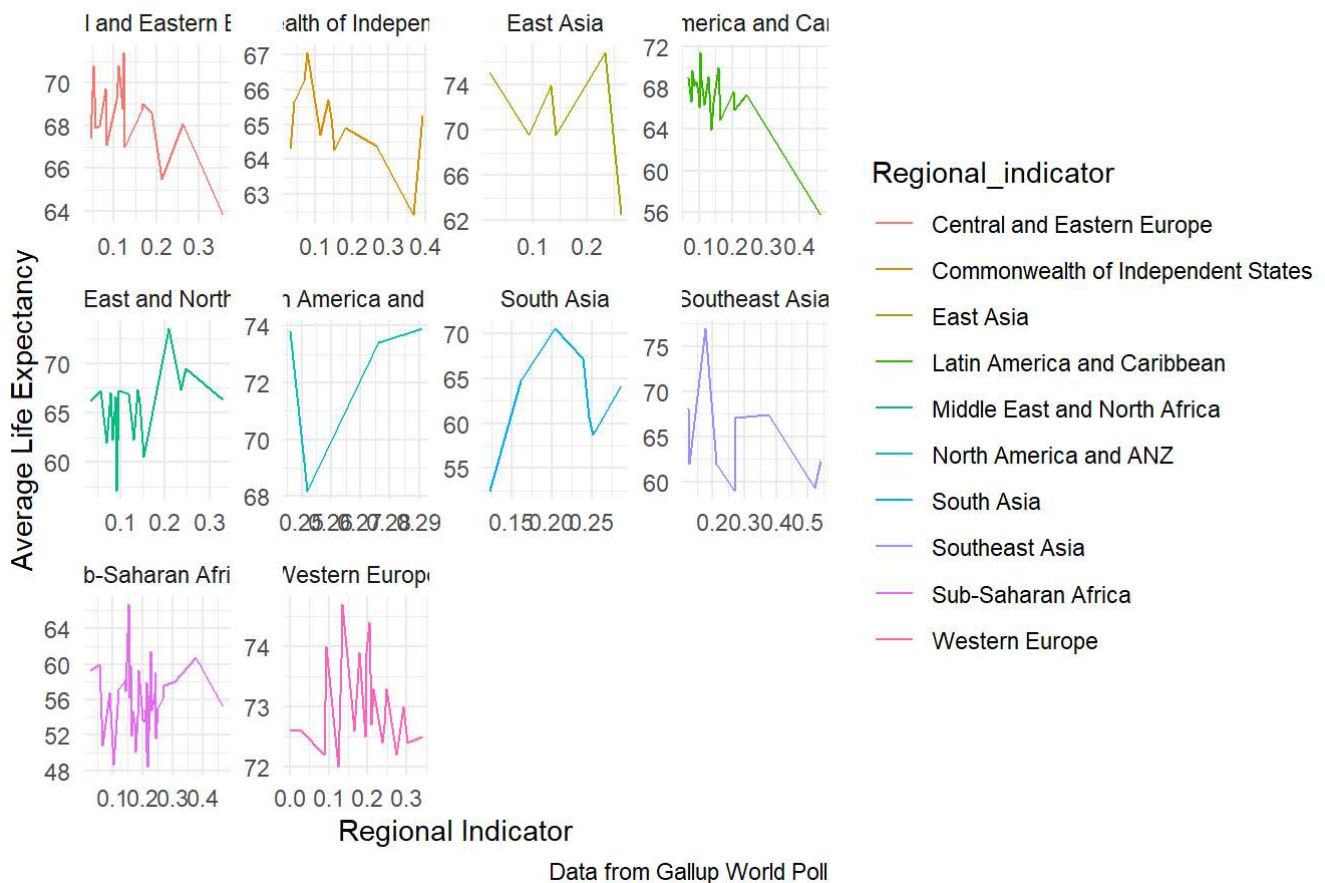
#Healthy life expectancy explained by freedom to make life choices

Figure 3: Healthy Life Expectancy based on Freedom to make life choices



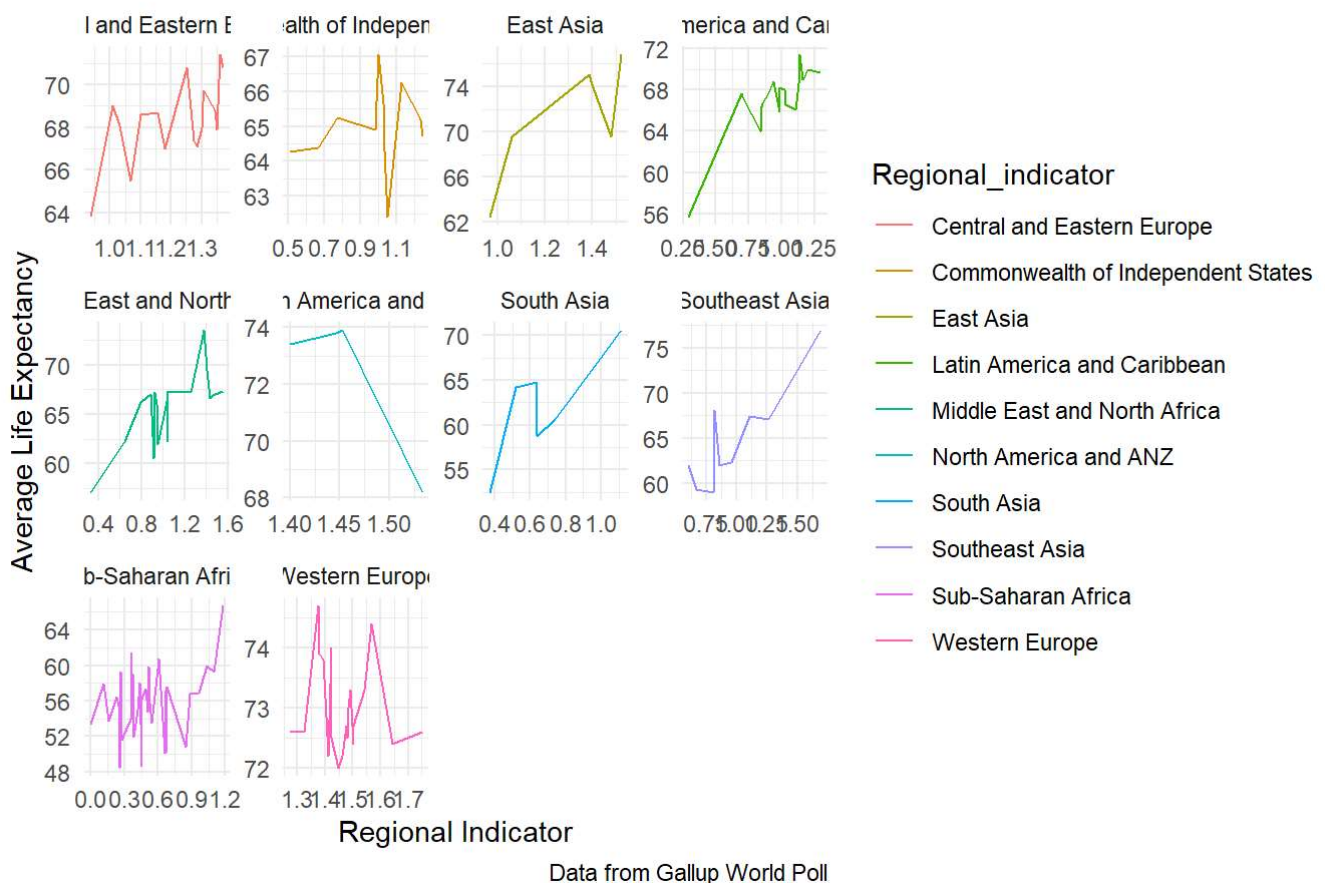
#Healthy life expectancy explained by generosity

Figure 4: Healthy Life Expectancy based on Generosity



#Healthy life expectancy explained by log GDP per capita

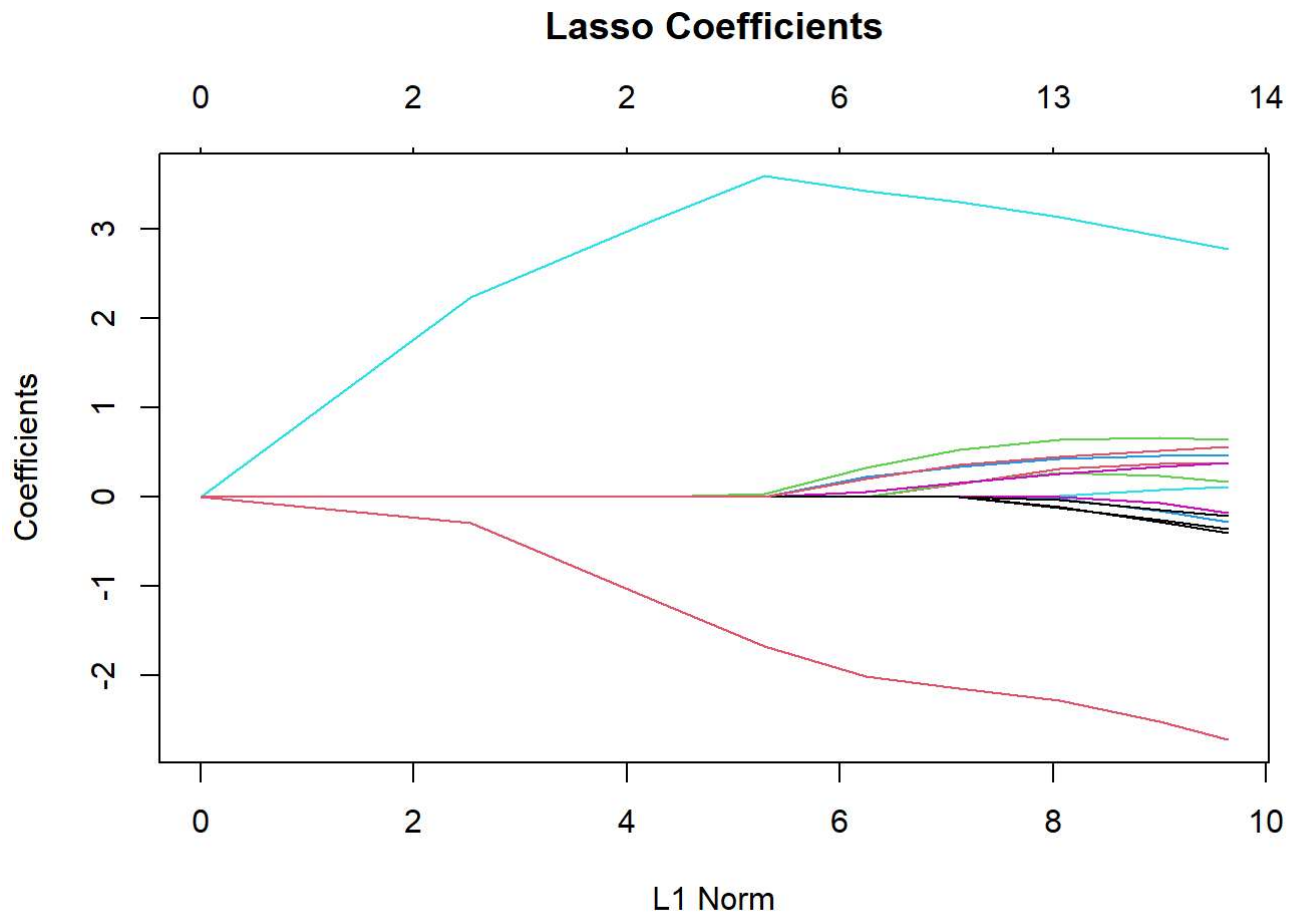
Figure 5: Healthy Life Expectancy based on log GDP per Capita





# First Model: Hand-Built Linear Model

#Second Model: Lasso



Lasso Model Predictor Estimates

Predictor	Estimate
(Intercept)	64.9927987
Regional_indicatorCommonwealth of Independent States	-0.3525427
Regional_indicatorEast Asia	0.3784084
Regional_indicatorLatin America and Caribbean	0.1984822
Regional_indicatorMiddle East and North Africa	-0.2275090
Regional_indicatorNorth America and ANZ	0.0978176
Regional_indicatorSouth Asia	-0.1277375
Regional_indicatorSoutheast Asia	-0.3126565
Regional_indicatorSub-Saharan Africa	-2.6287690
Regional_indicatorWestern Europe	0.6505050
Explaine_by_Social_support	0.4599257

Predictor	Estimate
Explained_by_Log_GDP_per_capita	2.8381235
Explained_by_Freedom_to_make_life_choices	0.3632975
Explained_by_Generosity	-0.1865809
Explained_by_Perceptions_of_corruption	0.5414321

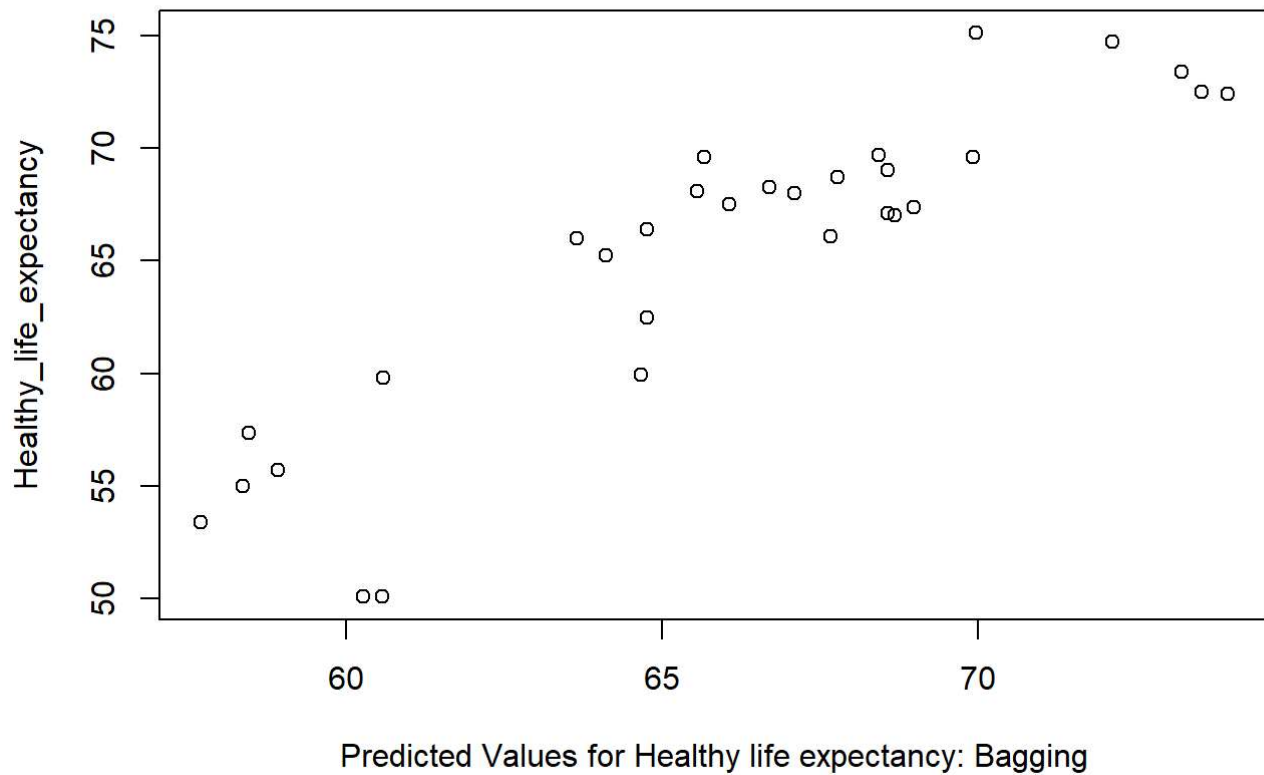
Mean RMSE

Mean RMSE	
Hand-Built Linear Model	2.889536
Lasso	2.920804

## ##Bagging

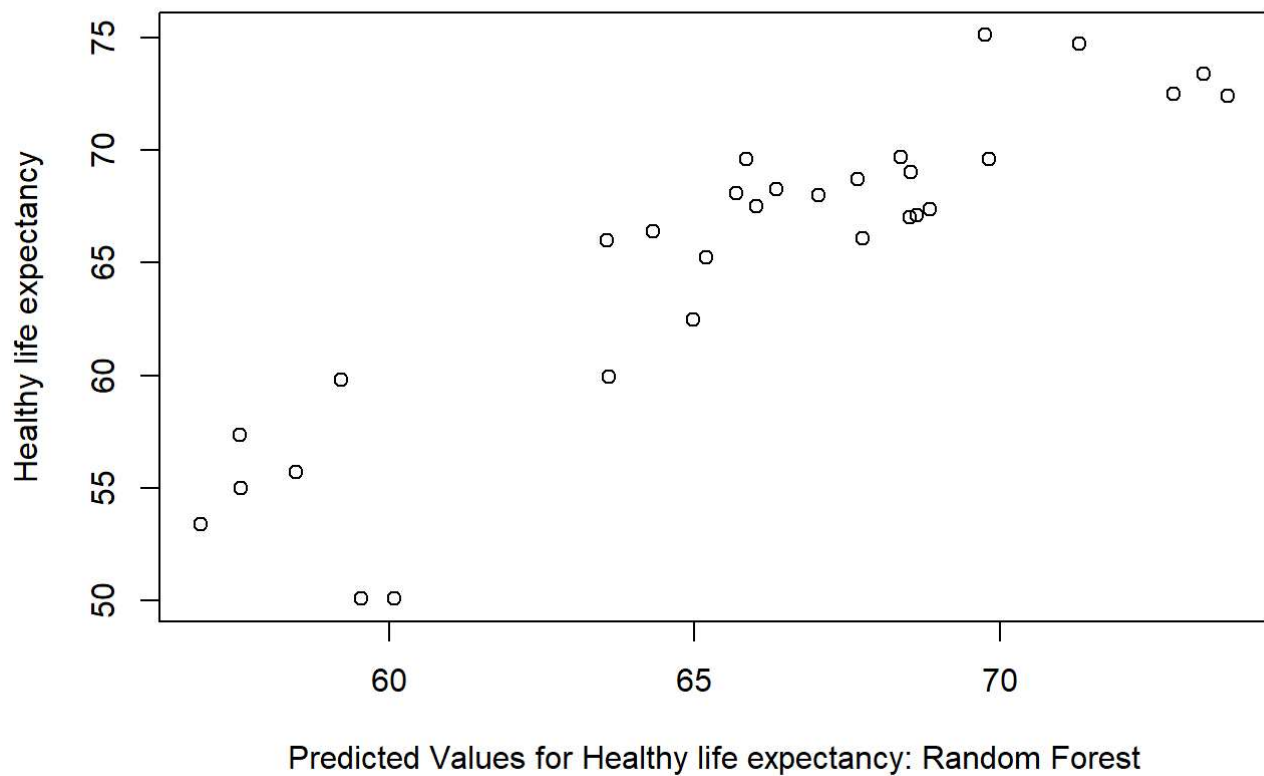
```
##
## Call:
## randomForest(formula = Healthy_life_expectancy ~ Regional_indicator +      Explaine_by_So
cial_support + Explained_by_Log_GDP_per_capita +      Explained_by_Freedom_to_make_life_choic
es + Explained_by_Generosity +      Explained_by_Perceptions_of_corruption, data = happiness_
train,          mtry = 7, importance = TRUE)
##           Type of random forest: regression
##           Number of trees: 500
## No. of variables tried at each split: 6
##
##           Mean of squared residuals: 10.18471
##           % Var explained: 77.39
```

## on between Bagging Predicted Healthy life expectancy and Actual Healthy I



#Random Forest

## between Random Forest Predicted Healthy life expectancy and Actual Healt



# Comparison of all 4 Predictive Models: Hand-Built Linear Model, Lasso, Bagging and Random Forest:

```
## [1] 39.54143
```

```
## [1] 3.051648
```

```
## [1] 3.203863
```

```
## [1] 3.168614
```

## LOOCV RMSE per Model

	LOOCV RMSE
LOOCV RMSE Healthy_life_expectancy Hand-Built Model	39.541431
LOOCV RMSE Model Lasso Model	3.051648
LOOCV RMSE Model Bagging Model	3.203863
LOOCV RMSE Model RandomForest Model	3.168614

## Variable Importance in Random Forest Model

Predictor	% Increase in MSE	Increase in Node Purity
Regional_indicator	30.082927	754.1742
Explaine_by_Social_support	15.264049	1672.2886
Explained_by_Log_GDP_per_capita	37.503353	3304.4905
Explained_by_Freedom_to_make_life_choices	10.638065	354.3696
Explained_by_Generosity	2.600966	192.6107
Explained_by_Perceptions_of_corruption	10.888940	299.0840