

STAT 462 Final Project

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Group Memeber

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Background

The Insurance dataset extracted from Kaggle.com describes the medical costs for over 1300 individuals based on their age, sex, BMI, how many children, Smoker or not, and which region in the U.S they lived. The goal of the project is to compare multiple ML method including multiple linear regression in order to find the best model with the lowest MSE value. In addition, there will be a detail diagnostic on the linear regression model for the assumptions, outliers, and other possible issues.

Exploratory Data Analysis

Data Statistics

Table 1: Basic statistics of quantitative variables

| | vars | n | mean | sd | min | max | range | se |
|----------|------|------|----------|----------|---------|----------|----------|--------|
| age | 1 | 1338 | 39.21 | 14.05 | 18.00 | 64.00 | 46.00 | 0.38 |
| bmi | 2 | 1338 | 30.66 | 6.10 | 15.96 | 53.13 | 37.17 | 0.17 |
| children | 3 | 1338 | 1.09 | 1.21 | 0.00 | 5.00 | 5.00 | 0.03 |
| charges | 4 | 1338 | 13270.42 | 12110.01 | 1121.87 | 63770.43 | 62648.55 | 331.07 |

Testing

Data Visualization

LINE Assumption

Model Building

Multiple Linear Regression

KNN Regression

Random Forest

Model Comparison

Discussion

Conclusion

Code Appendix