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Introduction to data science

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https://github.com/tstef87/IDS/tree/main/HW3

- How does Adult mortality rates affect life expectancy?
  - Adult mortality rates are almost perfectly negatively correlated with each other(-0.86553)
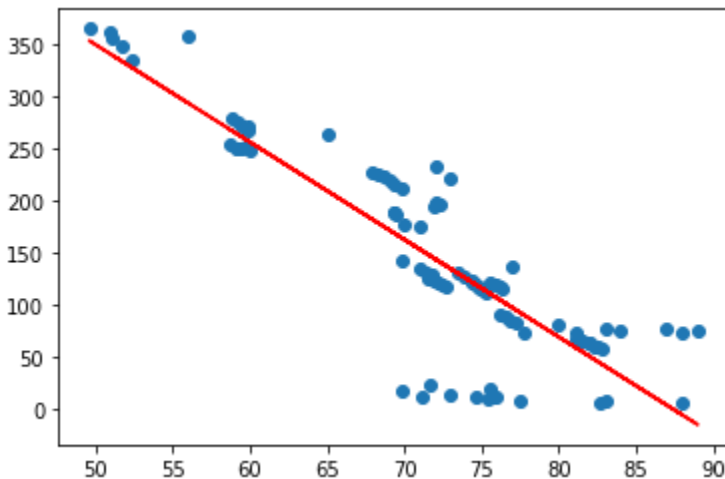
- Does life expectancy have positive or negative correlation with eating habits, drinking alcohol, social factors, and economic factors?
  - All four are positively correlated with each other.
    - Eating Habits correlation = 0.69849
    - Drinking Alcohol correlation = 0.35452
    - Social Factors correlation = 0.48980
    - Economic Factors correlation = 0.55269
- What is the impact of schooling on the lifespan of humans?
  - If one lives in a high schooling environment the data predicts that that individual will live a longer life
    - correlation = 0.75168
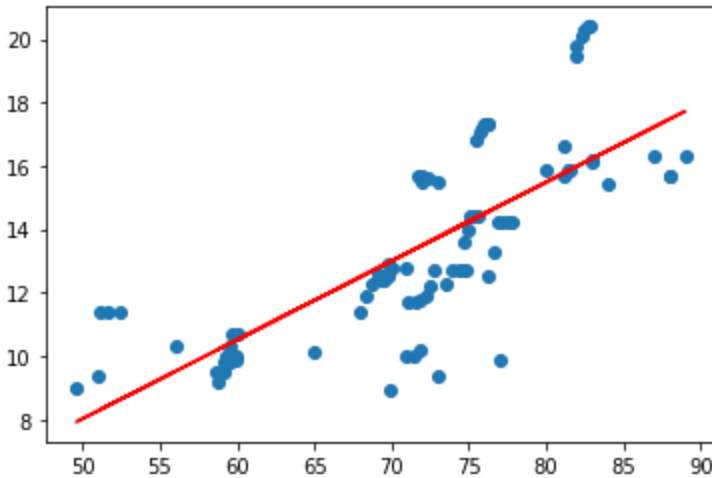
- Out of the 4 factors that I tested earlier (eating habits, drinking alcohol, social factors, economic factors) the highest correlated variable was eating habits.
- Correlation = 0.69849
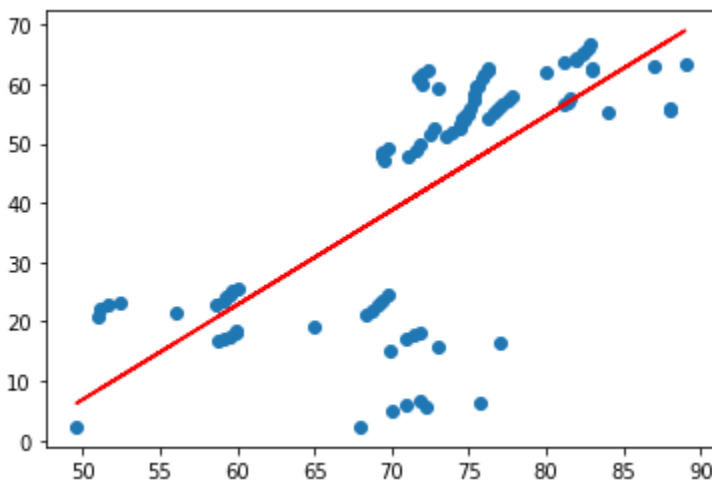
$$R^2 = 1 - \frac{SS_{RES}}{SS_{TOT}} = 1 - \frac{\sum_i (y_i - \hat{y}_i)^2}{\sum_i (y_i - \bar{y})^2}$$

R^2 = 0.4878817285865854

$$MSE = \frac{1}{n} \sum_{i=1}^{n} (y_i - \tilde{y}_i)^2$$

MSE = 211.929568537035

For this problem it would make more sense for us to come to a conclusion using MSE. by using MSE we are able to tell without seeing how close the data set is to being correlated. For example the closer MSE is to zero the more correlated it is.

Insights
The data-set aims to answer the following key questions:

1. Does various predicting factors which has been chosen initially really affect the Life expectancy? What are the predicting variables actually affecting the life expectancy?
   a. Yes, many of the factors in this data set are positively correlated to life expectancy, some more than others though. Some of the variables that are most correlated are BIM, and Schooling.
2. Should a country having a lower life expectancy value(<65) increase its healthcare expenditure in order to improve its average lifespan?
   a. Yes, perhaps that could work but in the data it seems that counties with a life expectancy lower than 65 do not have Schools. If the data is correct, they should implement schools before they increase healthcare.
3. How does Adult mortality rates affect life expectancy?
   a. Yes, Adult mortality is almost perfectly negatively correlated with life expectancy at a staggering -0.86553 making it the most correlated value in the dataset.
4. Does Life Expectancy have positive or negative correlation with eating habits, social factors, drinking alcohol, etc.?
   a. Life expectancy is positively correlated with every factor in this dataset besides Adult Mortality.
5. What is the impact of schooling on the lifespan of humans?
   a. Schooling is directly correlated with life expectancy. If the country has schooling the average life expectancy is much higher than countries that do not have schools
6. Does Life Expectancy have a positive or negative relationship with drinking alcohol?
   a. It has a positive relationship with drinking alcohol. Correlation = 0.35452
7. Do densely populated countries tend to have lower life expectancy?
   a. No, densely populated countries have have little to do with life expectancy.