

Steven Bradley
CSE 140 AA

0. Correlation between GDP and Satellite launches

1. **QUESTION:**

Is there a correlation between GDP and number of satellites launched by country?

RESULTS:

Pearson Correlation Coefficient for GDP/Satellites launched in USA : 0.49046440148

There is a strong positive correlation.

Pearson Correlation Coefficient for GDP/Satellites launched in China (PR) : 0.917535950658

There is a very strong positive correlation.

2. **MOTIVATIONS:**

Satellites are used for a number of technologies we use every day, so I thought it would be interesting to look at some satellite launch data. It would be interesting to see if there is a correlation between GDP and satellite launches because it could be used to predict economic conditions. If there is a good correlation, the number of satellites launched could be an indicator of a good economy.

3. **DATA:**

Satellite Launch Data:

http://www.ucsusa.org/assets/documents/nwgs/UCS_Satellite_Database_12-1-12.txt

Historical US GDP Data:

http://www.usgovernmentspending.com/us_gdp_history#copypaste

Historical Chinese GDP Data:

http://en.wikipedia.org/wiki/Historical_GDP_of_the_People's_Republic_of_China

Satellite Launch Data is automatically downloaded by my program, and I will be using it to get a count of US satellites launched each year.

The Historical GDP Data is annual and will be provided. Since the Satellite Launch Data is only from about 1976 to 2012, I will only be using the overlapping data. That is I will parse the data sets and get the gdp data from only the years I have satellite data.

4. **ALGORITHM:**

Check for necessary files

Check the current directory and make sure that satellite-data.txt and gdp data files are there. If satellite-data.txt isn't there, download it into the directory. If the gdp files aren't there, stop the program. These files cannot be downloaded and will be included with the source code.

Gather necessary data from files

Pass through satellite-data.txt and gather only the data for the specified country. Make a list of years mapping to a count of how many satellites that country launched that year.

Pass through gdp data file and gather only gdp data from same years as you got satellite launch data. Make a list of years mapping to the gdp for that year in that country.

Sort data in chronological order

Sort the lists of data (# of satellites launched per year and gdp per year) in chronological order. This is necessary in order to have the corresponding data to each year in the same place in each list.

Calculate Pearson Coefficient from data

Calculate each component of the formula below and use them to compute the Pearson correlation coefficient.

$$r_{xy} = \frac{\sum x_i y_i - n \bar{x} \bar{y}}{(n-1) s_x s_y} = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n \sum x_i^2 - (\sum x_i)^2} \sqrt{n \sum y_i^2 - (\sum y_i)^2}}$$

5. **RESULTS:**

Pearson Correlation Coefficient for GDP/Satellites launched in USA : 0.49046440148

There is a strong positive correlation.

Pearson Correlation Coefficient for GDP/Satellites launched in China (PR) : 0.917535950658

There is a very strong positive correlation.

CONCLUSION:

From the analysis done, we can conclude that there is strong correlation between how high a country's GDP is and how many satellites it launches in a year. Thus we can assume that when there is a high GDP, there will be many satellites being launched. When there are a lot of satellites being launched, there will be high GDP. This relationship is stronger for China than in the USA.

6. REPRODUCTION:

To reproduce the results shown on this report, simply run the program

7. I did not collaborate with any other students on this assignment.