

Project 1: Weather Trends

Project Outline

- (1) First I generated two csv files containing the global data as well as the data related to the city which is next to my domicile called Milan, Italy.

```
select * from global_data;
```

```
select * from city_data where city like 'Milan';
```

- (2) Then I decided to choose Haskell to accomplish this task.

For this project I wrote a command line tool in Haskell containing roughly 500 lines of code. This tool reads in both csv files but it deletes empty rows, i.e. the years where there are no temperatures available. To not having to write the necessary functions needed for traversing through a csv file I took the Haskell library `cassava`. The retrieved data was saved in a `Map`, i.e. some sort of a list, which only contains data with a specific datatype to guaranty the typesafety. Then the program calculates the moving average by selecting years together with its data belonging to a specific interval. The data is being summed up and divided by the length of the interval. Then the minimum and the maximum years of the interval are being increased by one and the next interval together with its data is being obtained, etc. I decided to generate intervals containing the data for 10 years. Ultimately, the program writes the moving averages into another csv file, again using `cassava`. The csv file has been uploaded to a server and can be viewed under this link:

<<https://github.com/amxyz-cyber/temp/blob/main/moving-average-weather-data.csv>>

Last but not least I took the `VegaLite` library to generate the chart by downloading the csv file from github and plotting the data into a png file. In Haskell this library is called `hvega` and I followed the instructions in this tutorial to accomplish this task:

<<https://hackage.haskell.org/package/hvega-0.11.0.1/docs/Graphics-Vega-Tutorials-VegaLite.html>>

When deciding how to plot the data I thought about how to visualize it without having too much white space. Consequently, I took care about the beginnings and endings of both axis. What's more, I selected an interval of 10 years so the sample size n is still large enough to allow for a detailed curve.

- (3) See `chart2.png`

Weather Trends

The moving temperatures of the City of Milan are lower than the global ones. They roughly differ between 1 and 2 degrees each year.

The trend for both categories suggests that the temperatures continue rising as they have been since 1900. Especially, since the mid 1980s there has been a steep increase of the temperatures as for both categories.

The ups and downs seem to be more imbalanced when looking at the curve which displays the temperature for the City of Milan. For example, during 1945 and 1954 there has been a steep increase of the overall temperature in Milan whereas during the same period the global temperatures rose mildly.

Until around 1900 the curves for both categories consisted merely of ups and downs with no clear trend that the temperatures would go upwards any time.