

Ex03: Temporal Data Visualization

2020-09-08

Introduction

Ex03 is about temporal data visualization. The assignment (see below for details) is to use D3 (details below) for a study of time-dependent weather data from Bergen.

Regarding **D3**, please check the following:

- The main source of information with respect to D3 is <https://d3js.org/> – there, you find the software, many examples, documentation, etc. (see, for ex., [archive.NYTimes.com/www.nytimes.com/interactive/2012/08/11/sunday-review/drought-history.html](https://archive.nytimes.com/www.nytimes.com/interactive/2012/08/11/sunday-review/drought-history.html) for a well-done visualization of time-dependent data with d3)
- You may like this short intro video by Mike Dewar: vimeo.com/35005701 (you can find lots of other intro material on the Internet)
- Further helpful notes include:
 - when using D3, it's recommended to use the online version d3.v6.js instead of running a local copy –
try “<script src="https://d3js.org/d3.v6.min.js"></script>”
 - consider programming / debugging in Google Chrome's developer tools
 - you may have to run a local server to provide data to your solution –
try “python -m SimpleHTTPServer 8000”

Regarding the **data**, you should work with a time series dataset that hosts 12 years of daily weather data (as provided by YR.no), including temperatures (daily min., max., average, and normal temperature), precipitation (in mm/day), snow (in cm-height), and wind information (average wind and wind gusts, both in m/s):

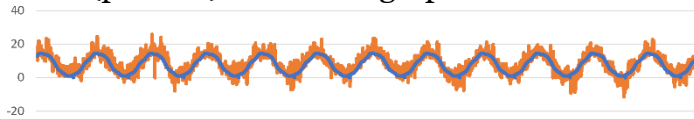
- Download *2020-09-08--YR-weather-data-Bergen-last-12-years.xlsx* from Mitt – the data for each day is an individual row (the rows above the column headers come with some simple, univariate statistics (just for information))
- Please note that YR.no provides almost fully complete data – still, a few entries are missing (maybe the instruments didn't work on that day or ...). You need to take care that you treat these days with missing data meaningfully, also
- In order to work with this data in D3, you'll have to convert it into a suitable format, for ex., JSON or CSV (comma-separated values)

If you wish to assemble your own data (of the same setup, i.e., multiple measures over time, you can do that, given that you “run” your plan by HH *early* – your plan should indicate (1) the time series data that you wish to look at and (2) the tasks that you wish to work out.

Assignment

Firstly, do the following (to achieve at least 50% in the evaluation, you need to work out the first four steps in a satisfactory way, at least):

1. Use either MS Excel or Tableau first to make some simple, first visualization some (parts of) the data – graph weather data over time, similar to



2. Get started with D3 (intro video, do something simple first) and then implement some appropriate visualization of the data – you can get inspired by the many already existing examples, for ex.,
 - observablehq.com/@d3/line-chart (Line Chart)
 - observablehq.com/@d3/realtime-horizon-chart (Horizon Chart)
 - observablehq.com/@d3/radial-area-chart (Radial Chart)
3. Consider the following questions and see, whether you can provide some answers, supported by your visualization:
 - Clearly, precipitation is important in Bergen.
Which months are wet? Which less so?
 - Where there any interesting periods during these 12 years (wrt. precipitation)? If so, in which way?
 - How do the 12 summers compare? How the 12 winters?
 - Any changes over the 12 years (in terms of the temperatures)?
 - A tropical night is one, where the temperature doesn't drop below 20°C
In Bergen??
 - What about freezing temperatures in Bergen?
What about snow in Bergen?
 - Anything of interest to say about wind (wind gusts) in Bergen?
 - Any relation between the different weather measures (temperatures, precipitation, wind)?

Secondly, for each of the above, collect your results (at least one screenshot plus a few written words as explanation) and put them together into a simple “report”. This report could be a text document (written in Word, for ex., and saved as PDF), or a slide deck (Powerpoint, for ex., saved as PDF). Include your D3 source.

Thirdly, wrap your report up with (1) a note about how many hours you used and (2) a few lines about lessons learned / your experiences while doing this exercise.

Delivery & deadline

Deliver your work (as an archive file, .zip or .rar, including a PDF file, your report, and your D3 files) via Mitt.UiB.no until the **deadline of 2020-09-21, 4pm**, and be prepared to use 8–10 minutes on Wed., 2020-09-23, during the course meeting to present your findings.

Get in contact as early as possible, if you have any questions – it is unlikely that you can get help / other answers within the last minutes before the submission deadline.

Evaluation: an approximate “percentage of achievement” will be used to evaluate everything, roughly along the following lines:

- 0% “nothing” (not delivered, ...)
- 25% “not OK” (something, but too many issues)
- 50% “just OK” (minimal effort solution, ...)
- 75% “good, but” (better than minimal, but certain issues ...)
- 100% “perfect” (excellent work!)

Hopefully, you find this exercise interesting and instructive!