Data Visualization Concepts

BINF4234

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Exercise and Homework Completion Requirements

- Exercises and reading assignments are mandatory and must be completed successfully to finish the class and take part in the final exam.
- Exercises are graded coarsely into only two categories: ***fail*** or ***pass***
    - A *pass* has to be achieved to complete an exercise successfully
- Turned in solutions will be scored based on completeness, functionality and readability.
- Do not copy assignments. We will use MOSS to detect plagiarism.

Submission Rules

- Submitted code must compile and run without errors on Mac OS X. Include in your deliverables a separate readme.txt file with a short description about the way you implemented it, the IDE you used and how it can be run.
- The whole project source code must be zipped and submitted within the given deadline, including exactly the files as indicated in the exercise.
- Submit your .zip archive named dvc_ex_1_MATRIKELNUMBER.zip (e.g. dvc_ex_1_01234567.zip) using DropBox through the OLAT course page.

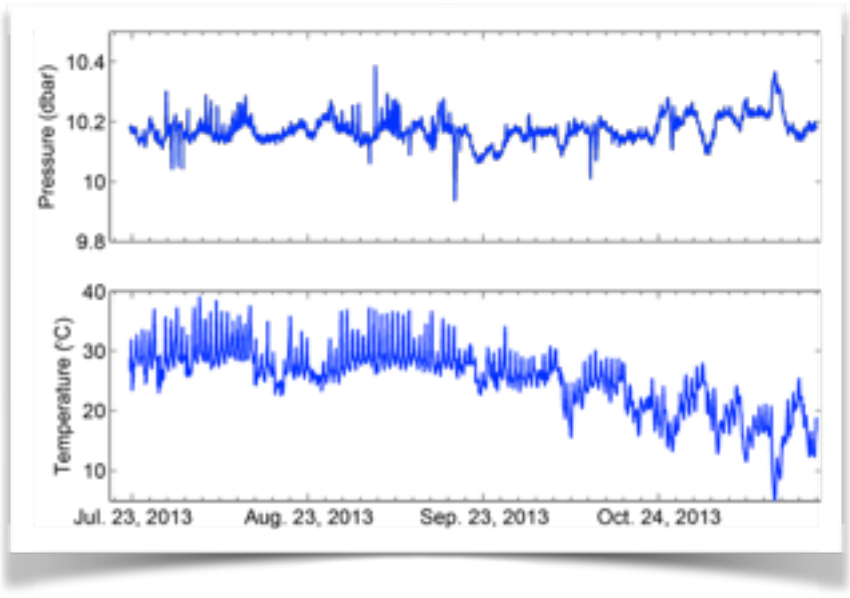
- **Deadline is Wednesday, 14 December 2016 at 23:59h**

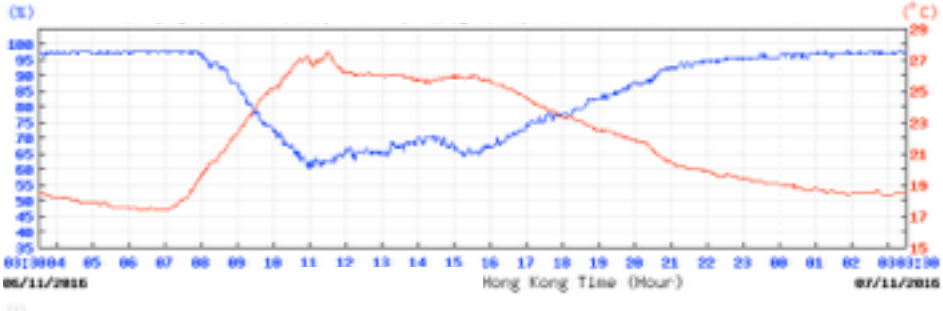
Exercise 2

In this exercise you will get some practical experience with processing and visualizing multivariate data. For this reason, you are provided with a multivariate dataset which simulates a hurricane. The data is provided by the National Center for Atmospheric Research in the United States and consists of several time-varying scalar and vector variables over large dynamic ranges. More details about it can be found in the end of the current document or in the following link: http://vis.computer.org/vis2004contest/data.html.

Since the dataset is quite big, we will focus on this exercise only to data related to temperature and pressure. Specifically, you will have to do the following:

1. In your first task, you will create a contour plot for the temperature (variable name: TCf). You should include proper legends, colorbar, titles, etc. for presenting the data. Contour plot can be either with lines or filled.
   Also, next to the plot introduce either a textbox with a button or a slider, which will allow the user to determine the elevation (i.e. slice height) of the simulated data. In the case of the textbox, restrict or guide the user to use proper values for it, and using the button update the data of the plot.
2. Following a similar process as in Task 1, present in the same way the pressure (Pf) created by the hurricane. Link the plot for temperature from Task 1 with the plot for pressure, so that both plots to use the same elevation level defined by the textbox or slider from Task 1.
3. Create a time-series visualization presenting both the temperature and the pressure in a combined plot. Two examples of two different ways to present such a visualization are presented below. If you need to define elevation, try to use the same elevation provided by the user as it is described in Task 2, otherwise use a fixed value of 0.4Km.





After completion of the exercise, save a screenshot from the final webpage or figure in a .png, .jpg or .pdf format and include it in your deliverables.

Hurricane Dataset

- Dataset was used in IEEE Visualization 2004 contest.
  - Link: http://vis.computer.org/vis2004contest/data.html
- Short description of dataset:
  - Hurricane Isabel (2003), WRF Model Data
  - 13 variables, 48 timesteps, data size 500 x 500 x 100
  - 23.7N/83W to 41.7N/62W ~2'700km
  - Each height point is 0.2km, max 19.8km
- Follow the download link from the above website in order to download the data you need for the exercise.