Introduction to Data Visualization

Hasso-Plattner-Institut
Fachgebiet Computergrafische Systeme
Prof. Dr. Jürgen Döllner

Winter Term 2020/2021 – Assignment Sheet # 3

Objectives

With these assignments you will learn how to

- Create a Parallel Coordinates Plot for displaying multidimensional data.
- Select various charts for visualizing financial data.
- Apply basic design concepts for creating and evaluating informative graphics.

For your programming tasks, you will use D3.js together with JavaScript integrated in a HTML file. First install node and a simple web server by typing

- npm install http-server -g

in your command line. In order to load CSV files you need to start a local server by typing

- http-server -a 127.0.0.1 -o

in the directory where your files are located. In each subtask you need to modify the provided HTML file, e.g., modify Ex2c.html for Exercise 2 c). If images are available, they serve only as an example and do not represent a binding solution. The sizes of the DOM objects, e.g., the radii of circles or color schemes, should be chosen in an appropriate way but are not restricted to one single possibility. Color schemes can be loaded from colorbrewer[1], for details about D3.js you can refer to its documentation[2]. Your solutions must be uploaded via Moodle till **January 13, 2021, 9am (UTC+1)** as one ZIP file that contains all HTML files and the respective data sources. The naming convention for this ZIP file is **sheet3_<Matrikelnummer1>_<Matrikelnummer2>.zip**.

Exercise 3.1: Parallel Coordinates Plot for Red Wine Quality (6 Points)

The data set winequality-red.csv[3] contains 1599 data items described by twelve numerical attributes. The aim of this task is to create a Parallel Coordinates Plot (PCP), which shows a possible relationship between the quality and the other features. For this purpose create a PCP that represents each object as a line segment and map its quality onto the color. To improve readability, the scaling and arrangement of the axes should be chosen carefully.

Exercise 3.2: Basic Charts for Daily Cryptocurrency Data (12 Points)

The data set crypto-markets.csv[4] contains the market data for various cryptocurrencies over the last years. Basic diagrams and their use will be practised on the basis of this data. For each subtask, implement a suitable visualization to represent the issue described.

a) The chart visualizes for a single currency both the price movement over a selected period of time and the price development within a specific time span (e.g. one day).

b) The chart compares the price movement of any number of currencies over a period of time.

c) The visualization facilitates the comparison of a selected currency with its respective trend line over 9, 21, and 50 days.

A completely correct solution requires not only the choice of a suitable diagram type but also the meaningful use of supplementary information as well as interaction possibilities. The visualization itself consequently has to be self-explanatory.

Exercise 3.3: Discussion of given visualizations Part 2 (2 Points)

In the zip file of this exercise sheet you find four visualizations from different domains. Describe at least one negative or misleading aspect of each.

[1] Colorbrewer2
[2] D3.js Documentation
[3] Cortez et al, 2009, Red Wine Quality
[4] Daily Crypto Currency Data

Instructions

Pair Programming On these assignments, you are encouraged (not required) to work with a partner provided you practice pair programming. Pair programming „is a practice in which two programmers work side-by-side at one computer, continuously collaborating on the same design, algorithm, code, or test.“ One partner is driving (designing and typing the code) while the other is navigating (reviewing the work, identifying bugs, and asking questions). The two partners switch roles every 30–40 minutes, and on demand, brainstorm.

Violation of Rules A violation of rules results in grading the affected assignments with 0 points.

- Writing code with a partner without following the pair programming instructions listed above (e.g., if one partner does not participate in the process) is a serious violation of the course collaboration policy.
- Plagiarism represents a serious violation of the course policy.