PBM 776: Introduction to Visualization

Course at RTU Riga Business School

Updated Feb 10, 2023

Administrative details

Instructors:
- Leo Seļāvo (lectures) leo.selavo@rbs.lv
- Oskars Radziņš (lectures) oskars.radzins@rbs.lv
- Jānis Lazovskis (labs) janis.lazovskis@rbs.lv

Meeting times:
- Mondays 11:10 - 12:50 (lecture)
- Thursdays 11:10 - 12:50 (labs)

Websites:
- Internal (on ORTUS): estudijas.rtu.lv/course/view.php?id=336315
- External (for labs and as backup): jlazovskis.com/teaching/introvis

Drop-in hours:
- Jānis: Mondays 16:00 - 17:00 in 404 or on Zoom, bookable at calendly.com/jlazovskis

Overview

The Introduction to visualization course is about theoretical and practical aspects of presenting data, using visualization tools and techniques. Data visualization is a coherent way to visually communicate quantitative content.

The course has two tracks:
- **Theory** - the physiological and psychological aspects of data visualization. The interdisciplinary mix of topics about how humans perceive and process visual information. The rules of presenting the data employing various modes of communication. This will be mostly covered in the lectures.
- **Practice** - the technical aspects of extracting data and transforming it to a visual representation with various tools. Basic principles for cleaning, normalizing, and comparing data. This will be mostly covered in the labs. The labs will involve working with different programs and discussing created work.

Learning outcomes

- Design and create data visualizations.
- Conduct exploratory data analysis using visualization.
- Craft visual presentations of data for effective communication.

- Use knowledge of perception and cognition to evaluate visualization design alternatives.
- Design and evaluate color palettes for visualization based on principles of perception.
- Apply data transformations such as aggregation and filtering for visualization.
- Identify opportunities for application of data visualization in various domains.
- Critique existing visualizations based on data visualization theory and principles.

Calendar

The calendar is provided as a guideline, and is subject to change.

Week	Lecture topic (Monday)	Lab activity (Thursday)	Deliverable
1 (Jan 2)	*No lecture*	Introduction & Basic data viz with Google Sheets / MS Excel	
2 (Jan 9)	Introduction, data types	Basic data viz with PowerBI	
3 (Jan 16)	Data selection, normalization. Purpose, audience.	Basic data viz with Python	
4 (Jan 23)	Color	Graphical interface viz tools	Quiz 1 Project 1 choice due
5 (Jan 30)	Consistency and clarity. Programming tools.	Choosing a visual type	
6 (Feb 6)	Big data	Data sources	Quiz 2
7 (Feb 13)	Different plot types	Color	
8 (Feb 20)	Visualization tools. Applications.	Project 1 presentations	Quiz 3 Project 1 due
9 (Feb 27)	Image perception. Human and computer vision	Test data	
10 (Mar 6)	Visualizing networks	Guest speakers: Daniels Kalniņs, Power BI Roberta Mūrniece, Data science	Quiz 4
11 (Mar 13)	Image types. Visual data processing.	Data ethics	Project 2 proposal due
12 (Mar 20)	Interactive visualizations	Visual storytelling	Quiz 5
13 (Mar 27)	Evaluation and critique of visualizations	Choropleth maps	

14 (Apr 3)	Ethical implications. Hidden meanings.	*Extra lab for catching up*	Quiz 6 Project 2 due

Grading

Students will receive their grade for the course based on the following criteria:
- 10% active participation
- 10% weekly quizzes
- 40% lab submissions
- 10% project 1
- 30% project 2, consisting of:
  - 5% proposal and plan
  - 25% presentation and submission

Participation will be measured at the end of the semester based on attendance and interaction with other students and the instructors. Grading schemes for the projects will be released during the semester.

Most labs will have a submission component, either a visual image, code, or written text. The labs that do have a submission will have it graded 0, 1, or 2, by the following specifications:
- 0: nothing has been submitted or no effort is visible in submission
- 1: something has been submitted, effort is visible, but key requirements are missing
- 2: everything or almost everything is submitted as asked

Academic integrity

You are encouraged to work together to complete lab submissions and projects, but please submit your own work. The work you submit must be your own and should reflect your own understanding of the material. Part of the RBS official stance on academic integrity is included below.

RTU Riga Business School values intellectual integrity and the highest standards of academic conduct. To be prepared to meet societal needs as leaders and role models, students must be educated in an ethical learning environment that promotes a high standard of honor in scholastic work. Academic dishonesty undermines institutional integrity and threatens the academic fame of RBS. Dishonesty is not an acceptable avenue to success. It diminishes the quality of RBS education, which is valued because of RBS high academic standards.

Fostering an appreciation for academic standards and values is a shared responsibility among students, faculty, and staff. RBS prohibits dishonesty in connection with any RBS activity. [..] A commitment of acts of cheating, lying, and deceit in any of their

diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated.