Data Visualization

INTRODUCTION

Lecturer: Tea Tušar

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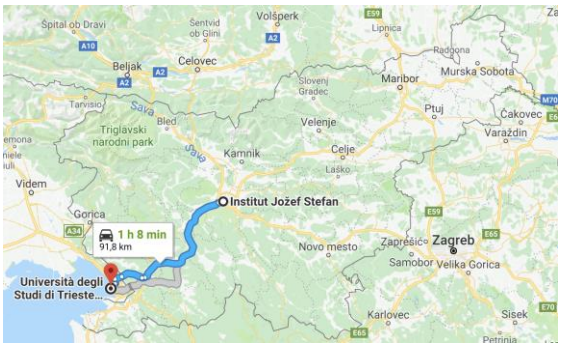
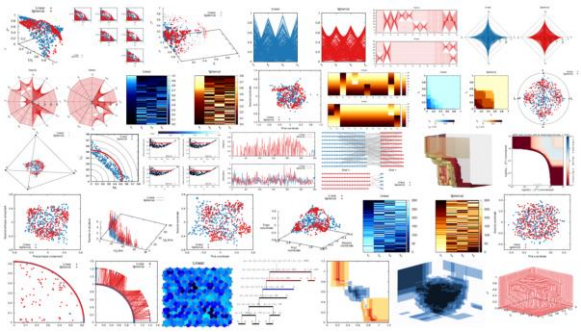
Both in Ljubljana, Slovenia



Background

- BSc in Applied Mathematics
- MSc In Computer Science
- PhD in Information and Communication Technologies
- PhD dissertation: Visualizing Solution Sets in Multiobjective Optimization



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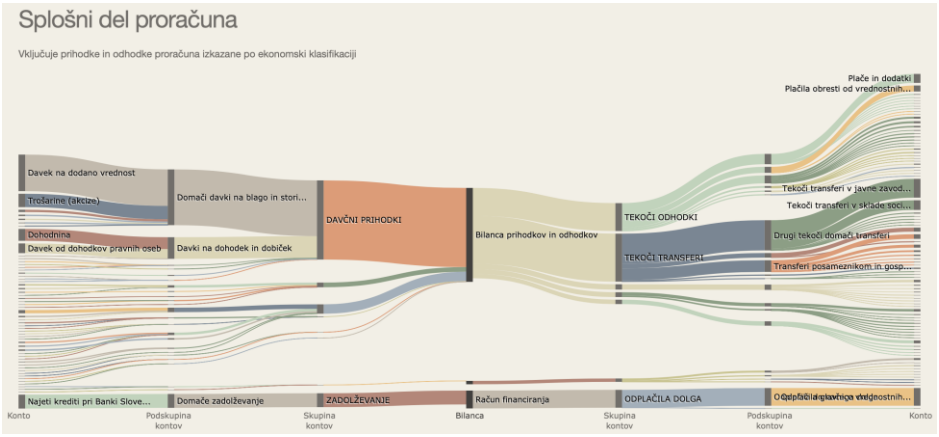
State budget



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Contact

Via Teams (preferred), available only until September 2024

By email

- tea.tusar@ijs.si
- Subject: Data Visualization Course …

During breaks and after lectures

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About the course

Objective: To develop a strong foundation on data visualization

- Understand why and how visualization works
- Spot lying visualizations
- Learn to make trustworthy and accessible visualizations
- Gain knowledge beyond the usage of some tools (but also use tools to construct an interactive visualization)
- Learn to make better presentations

Prerequisites (not mandatory for completing the course)

- Basic knowledge of Python and scientific Python

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Syllabus

- Foundations: defining data visualization, historical visualizations, the purposes of data visualization and the three principles of good visualization design
- Data abstraction: dataset types, attributes types and semantics
- Task abstraction: goals and tasks, actions and targets
- Human visual perception: attention and memory, visual encoding, visual order, color perception and color specification
- Designing a visualization: steps of visualization design, basic charts, visualizing multivariate data, uncertainty and missing data, interactivity, storytelling and tools
- Examples: (un)trustworthy and (in)accessible visualizations
- Creating interactive visualizations in Python

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Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
	Sep 25	Sep 26	Sep 27	Sep 28	Sep 29	Sep 30	Oct 1
2 pm – 6 pm		Lecture 1					
	Oct 2	Oct 3	Oct 4	Oct 5	Oct 6	Oct 7	Oct 8
2 pm – 6 pm		Lecture 2					
	Oct 9	Oct 10	Oct 11	Oct 12	Oct 13	Oct 14	Oct 15
2 pm – 6 pm		Lecture 3					
	Oct 16	Oct 17	Oct 18	Oct 19	Oct 20	Oct 21	Oct 22
2 pm – 6 pm		Lecture 4					
	Oct 23	Oct 24	Oct 25	Oct 26	Oct 27	Oct 28	Oct 29
2 pm – 6 pm		No lecture!					
	Oct 30	Oct 31	Nov 1	Nov 2	Nov 3	Nov 4	Nov 5
2 pm – 6 pm		Lecture 5					
	Nov 6	Nov 7	Nov 8	Nov 9	Nov 10	Nov 11	Nov 12
2 pm – 6 pm		Lecture 6					

3 x 60 minutes (2 breaks): 14:00 to 15:00, 15:15 to 16:15, 16:30 to 17:30

Information Retrieval starts on November 8 (TUE & WED)

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Participation

What is meant by participation
- Attending the lectures (in person)
- Asking questions, answering my questions

Interrupt me at any time

Important for you
- Keeps you engaged
- Helps you understand the course material better

Important for me ⇒ important for you
- I can explain examples/concepts in more detail when needed
- Helps me give the best possible lectures

Five assignments
- Due the following Friday
- Not obligatory, but good for you

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Exam (in project form)

Groups of 3 students

Design visualizations on some topic (free choice)
- Prepare visualizations up to one week before the exam
- Present visualizations at the exam
- Be prepared to answer questions about your visualization choices

More details during the last lecture

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Course materials

Available on Moodle

- Links to numerous sources of data (already available)
- Information about various data visualization challenges (already available)
- Slides with lots of links (after lectures)
- Python code and data (when relevant)

Available on Teams

- Lecture recordings (after lectures)

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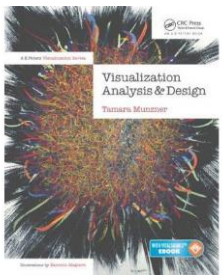
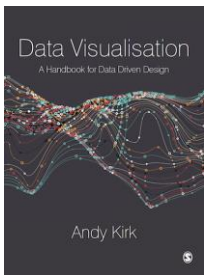
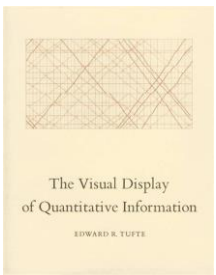
Books

- Tamara Munzner. Visualization Analysis & Design. A K Peters Visualization Series, CRC Press, Boca Raton, 2014.
- Andy Kirk. Data Visualization: A Handbook for Data Driven Design. SAGE Publications, London, 2016.
- Edward R. Tufte. The Visual Display of Quantitative Information. Graphics Press, Cheshire, 2015.







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Online resources

Blogs with tips and tutorials (in alphabetical order)

- Datawrapper: https://blog.datawrapper.de
- Eager eyes: https://eagereyes.org
- FlowingData: https://flowingdata.com
- Information is beautiful: https://informationisbeautiful.net
- PolicyViz: https://policyviz.com
- Randal S. Olson: https://randalolson.com/blog
- Storytelling with data: https://www.storytellingwithdata.com/
- The functional art: http://www.thefunctionalart.com
- Telling stories with data: http://www.chadskelton.com
- Vis4.net: https://www.vis4.net/blog/
- Visualizing data: http://www.visualisingdata.com
- Vizdata (in Italian): https://www.vizdata.it

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Podcasts

http://datastori.es
By Enrico Bertini and Moritz Stefaner
170 episodes, ~45 min/episode

https://www.storytellingwithdata.com/podcast/
By Cole Nussbaumer Knaflic
69 episodes, ~45 min/episode

https://policyviz.com/podcast/
By Jonathan Schwabish
244 episodes, ~30 min/episode, with transcripts

https://linktr.ee/exploreexplain
By Andy Kirk
32 episodes, ~60 min/episode, with videos

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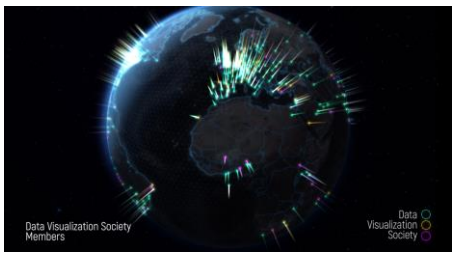
Data Visualization Society

- More than 19,000 members
- Website: https://www.datavisualizationsociety.com
- Newsletter, Slack channel, challenges, resources, jobs, …
- Journal Nightingale: https://nightingaledvs.com/

DATA VISUALIZATION SOCIETY



https://www.datavisualizationsociety.com/member-data-challenge/2019/3/28/dvs-global-members

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Challenges

#MakeoverMonday
- Weekly challenge
- Create better visualization for the given data
- http://www.makeovermonday.co.uk/

#SWDchallenge (SWD = Storytelling with data)
- Monthly challenge
- Practice and apply data visualization and storytelling skills
- https://www.storytellingwithdata.com/swdchallenge/

Many other challenges, see Moodle

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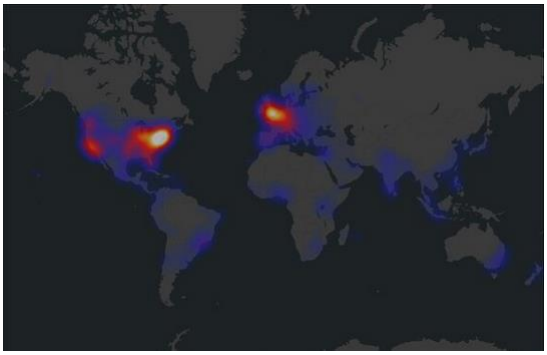
Disclaimer

Most examples are US- and UK-centric



https://www.datavisualizationsociety.com/one-year-membership-challenge/2020/5/4/dvs-is-global-with-room-to-grow-wzw6x-4gs6m-3bzs2

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