Data Visualization

INTRODUCTION

Before we begin…

Lectures in person, except when not possible (this and next week)

Please turn on your cameras

Feel free to interrupt me any time
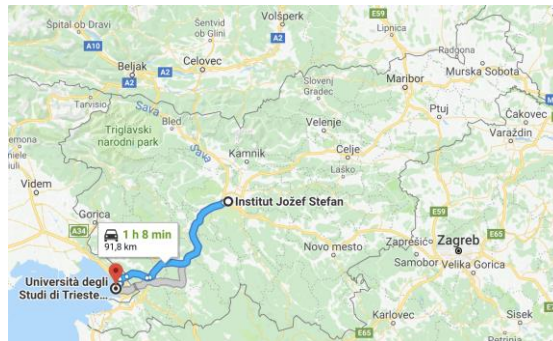
Ice breaker: Tell us something boring about you

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Lecturer: Tea Tušar

Research Associate at the Department of Intelligent Systems, Jožef Stefan Institute

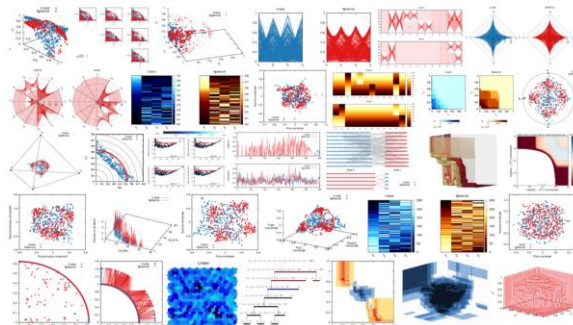*Assistant Professor* at the Jožef Stefan International Postgraduate School

Both in Ljubljana, Slovenia

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Background

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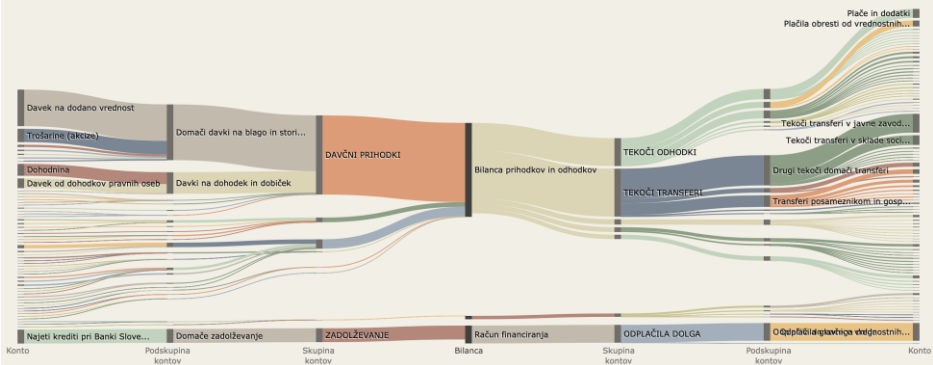

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State budget

Splošni del proračuna

Vključuje prihodke in odhodke proračuna izkazane po ekonomski klasifikaciji

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Contact

Via Teams (preferred)

By email
o tea.tusar@ijs.si
o Subject: [DataVisualization] …

During breaks, after lessons

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About the course

Objective: To develop a strong foundation on data visualization
o Understand why and how visualization works
o Spot lying visualizations
o Learn to make trustworthy and accessible visualizations
o Gain knowledge beyond the usage of some tools (but also use tools to construct an interactive visualization)
o Learn to make better presentations

Prerequisites (not mandatory for completing the course)
o Basic knowledge of Python and scientific Python

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Syllabus

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

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Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
	Nov 15	Nov 16	Nov 17	Nov 18	Nov 19	Nov 20	Nov 21
Morning				Lecture 2			
Afternoon			Lecture 1				
	Nov 22	Nov 23	Nov 24	Nov 25	Nov 26	Nov 27	Nov 28
Morning				Lecture 4			
Afternoon			Lecture 3				
	Nov 29	Nov 30	Dec 1	Dec 2	Dec 3	Dec 4	Dec 5
Morning				Lecture 6			
Afternoon			Lecture 5				

Afternoon lectures: 14:15 – 15:45 and 16:00 – 17:30

Morning lectures: 9:15 – 10:45 and 11:00 – 12:30

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Participation

What is meant by participation
- o Attending the lectures
- o Asking questions, answering my questions

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

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

Two assignments
- o After lectures 2 and 4 – each due the following Tuesday
- o Not obligatory, but will influence the exam grade in case of being between grades

Interrupt me
any time

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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 later on (third week)
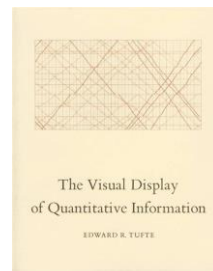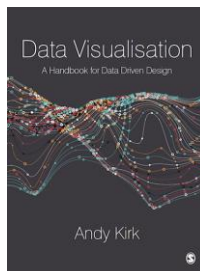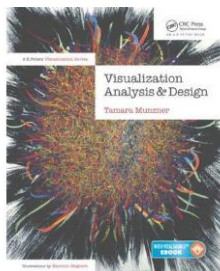
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Course materials

Available on Moodle
- Links to numerous sources of data (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

- o Tamara Munzner. Visualization Analysis & Design. A K Peters Visualization Series, CRC Press, Boca Raton, 2014.
- o Andy Kirk. Data Visualization: A Handbook for Data Driven Design. SAGE Publications, London, 2016.
- o 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)
- o Chartable: https://blog.datawrapper.de
- o Eager eyes: https://eagereyes.org
- o FlowingData: https://flowingdata.com
- o Information is beautiful: https://informationisbeautiful.net
- o PolicyViz: https://policyviz.com
- o Randal S. Olson: http://www.randalolson.com/blog/
- o Storytelling with data: https://www.storytellingwithdata.com/
- o The functional art: http://www.thefunctionalart.com
- o Telling stories with data: http://www.chadskelton.com
- o Vis4.net: https://www.vis4.net/blog/
- o Visualizing data: http://www.visualisingdata.com
- o Vizdata (in Italian): https://www.vizdata.it

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Podcasts

http://datastori.es

By Enrico Bertini and
Moritz Stefaner
Since February 2012
165 episodes (discontinued?)
~45 min / episode

https://www.storytellingwi
thdata.com/podcast/

By Cole Nussbaumer
Knaflic
Since November 2017
45 episodes
~45 min / episode

https://policyviz.com/podc
ast/

By Jonathan Schwabish

Since April 2015
204 episodes
~30 min / episode

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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/

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

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Challenges

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

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

Many other challenges
- o https://www.datavisualizationsociety.org/resources
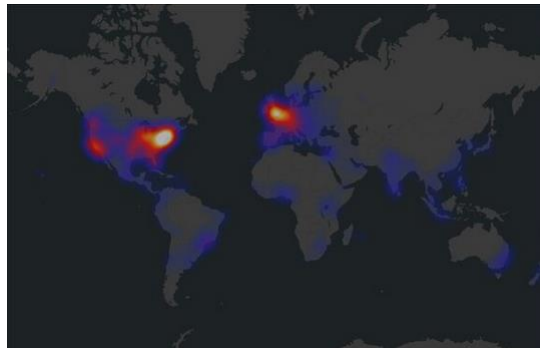
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Disclaimer

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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