Seminar 1 – project topics

HCI LAB   visitlab

Course Aim and Goal

- Today, you will pick a topic from our list or you can come with your own

- You can work individually or in groups

  - The number of people in the group will influence the required complexity of the final solution

  - We slightly prefer team projects ;)

- We will (roughly) follow the workflow used in the visualization research

  - You will go through all the stages including writing the research report.

- The main goal is to **understand what it means to do a research in visualizations**

Seminar organization

- Sharing progress (2nd and 4th seminar)

  - Up to 5 minutes – highlights of your work, achievements and failures

- Individual consultations

  - Consultations and feedback on your progress from Bára and Vítek

- Individual work on projects

  - Time for you to work on the issues you struggle with

- **We expect you to work on the project during the seminars and between them**

Grading Rules

- **Five deliverables** throughout the semester

- You need to get **at least 1/3 of the points** from **each** deliverable

- Not meeting the deadline = ½ of the points

- **Minimum score** for passing the course is **26 points**.

- **Grades:**
  - 50-46 points ………… A
  - 45-41 points ………… B
  - 40-36 points ………… C
  - 35-31 points ………… D
  - 30-26 points ………… E
  - 25-0 points ………… F

Deliverables 1/2

- D1: Do the related work research, familiarize with the data, formulate visualization task requirements, create the initial design sketch
  - *Related work, task requirements, data analysis (written report – Word / Google Docs / Miro / plaintex file)*
  - ***Deadline: March 6***
  - *5 points*

- D2: Finalize the design, select technologies, map data to the UI, start with the implementation (data processing)
  - *final design (pen&paper/digital sketches)*
  - *data processing implementation progress (show us the progress)*
  - ***Deadline: March 20***
  - *10 points*

Deliverables 2/2

- D3: Finalizing the implementation
  - *20 points: complete implementation*
  - *Deadline: May 14*
  - *20 points*

- D4: Presenting the result
  - *Project presentation*
  - *Deadline: May 15*
  - *5 points*

- D5: Project report
  - *Research report (initial submission) + feedback implementation (final submission)*
  - *Deadlines: June 16 – submit the report + June 23 submit final version*
  - *5+5 points*

Seminars Schedule

21. 2.	**Seminar 1**	**Assignment:** Related work research, obtaining the data, analysis of task requirements, preparing the sketch of the initial design
28. 2.		
		Feedback on: initial sketch (for review), data parser (to discuss)
		Assignment: Finalize the design, select technologies, map data to the UI, start with the the data processing implementation
6. 3.	**Seminar 2**	*Deliverable: Related work, task requirements, data analysis (D1)*
13. 3.		
		Feedback on: final design, data preprocessing state, selected technologies
		Assignment: implementation - data processing, initial UI layout (no interaction)
20. 3.	**Seminar 3**	*Deliverable: final design, data processing implementation progress (D2)*
27. 3.		
		Feedback on: current state of the implementation
3. 4.	**Seminar 4**	**Assignment:** Implementation of the interactivity (linked components, filtering, …)
10. 4.		
		Feedback on: current state of the implementation
17. 4.	**Seminar 5**	**Assignment:** Finish the implementation, prepare the presentation, written report info
22. 4.		
1. 5.	Public holiday (no seminar)	**Assignment:** Presentations + Written report - via e-mail
8. 5.	Public holiday (no seminar)	
15. 5.		*Deliverables: implementation (D3), presentation (D4)*
	exam period	*Deliverable: Research report (D5)*

Topic 1: Open Data Brno/Prague/Bratislava?

- Many big cities nowadays have Open Data portals containing various public datasets. For example this dataset mapping of movement, gender, age composition, method of transportation or groupness and activities of people within the Pribinova zone in Bratislava.

- https://opendata.bratislava.sk/en/dataset/show/Mapovanie-pohybu-ludi-v-ramci-zony-Pribinova

*For some of the datasets, you can find also their visual representations on their webpage. However, many of them are not appropriate. One example is the map of movements of citizens, captured from the data from mobile operators in Brno: https://data.brno.cz/app/41bd778ef2e24f8d985cd54a963ce7a6

Topic 2: NASA Data Visualization

- **NASA has many datasets publicly available**
  - https://data.nasa.gov/browse

- Browse the datasets, select one (or combine more of them), and design your visualization for that

Topic 3: Pan-cancer proteomic map of 949 human cell lines

The study by ProCan® team ([Gonçalves et al., 2022](#)) generated a comprehensive pan-cancer proteomic map of 949 human cancer cell lines to aid in the discovery of cancer biomarkers and targets for the development of new cancer treatments.

Task 1: Visualization of Peptide and Protein Intensities

- Create user-friendly, interactive visualizations.
- Include phenotypic information about tissue and cancer types.
- Define subcategories: house-keeping, tissue-specific, and cancer-specific proteins.

Task 2: Insight Extraction from Data Matrices

- Develop intuitive visualizations from peptide/protein data and annotations.
- Connect drug responses to proteins and cell lines seamlessly.

Task 3: Interactive Tool for Drug Response Data

- Visualize drug response data in relation to proteomic data across cell lines.
- Feature for selecting proteins to analyze associated drugs.
- Option to select drugs to visualize associated proteins

- Suitable for teams

- Bio+MedVis Challenge 2023
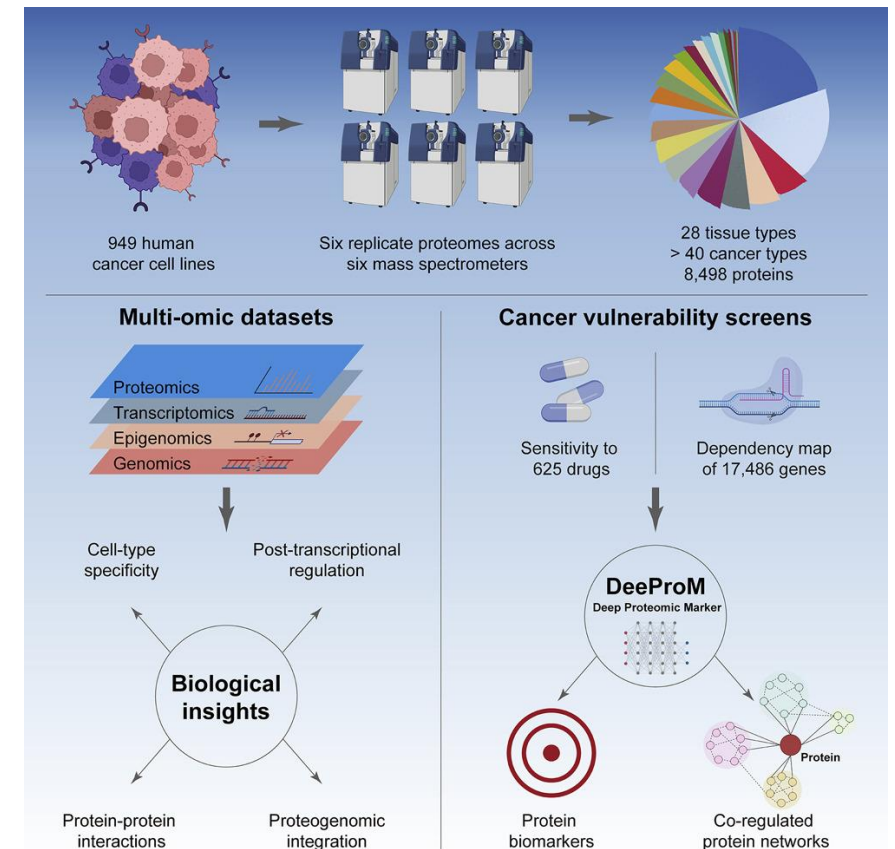
Topic 4: Illegal Fishing

VAST 2023 Challenge

Overview:
- Focus: Addressing illegal, unreported, and unregulated fishing worldwide.
- Context: Impact on marine ecosystems, food security, and regional stability.
- Organization: NGO FishEye International's data-driven approach.

Mini-Challenge 1: Contextualize Data
- Objective: Analyze extracted data from online news articles related to fishing.
- Goal: Understand the entities and relationships impacting marine industries.

**Mini-Challenge 2: Identify Patterns**
- Task: Use visual analytics to identify companies involved in illegal fishing.
- Context: Assistance requested by the country of Oceanus.

Mini-Challenge 3: Detect Anomalies
- Challenge: Develop a visual analytics approach to understand business anomalies.
- Data Source: International finance corporation's database on fishing companies.

- Suitable for teams

- https://vast-challenge.github.io/2023/overview.html
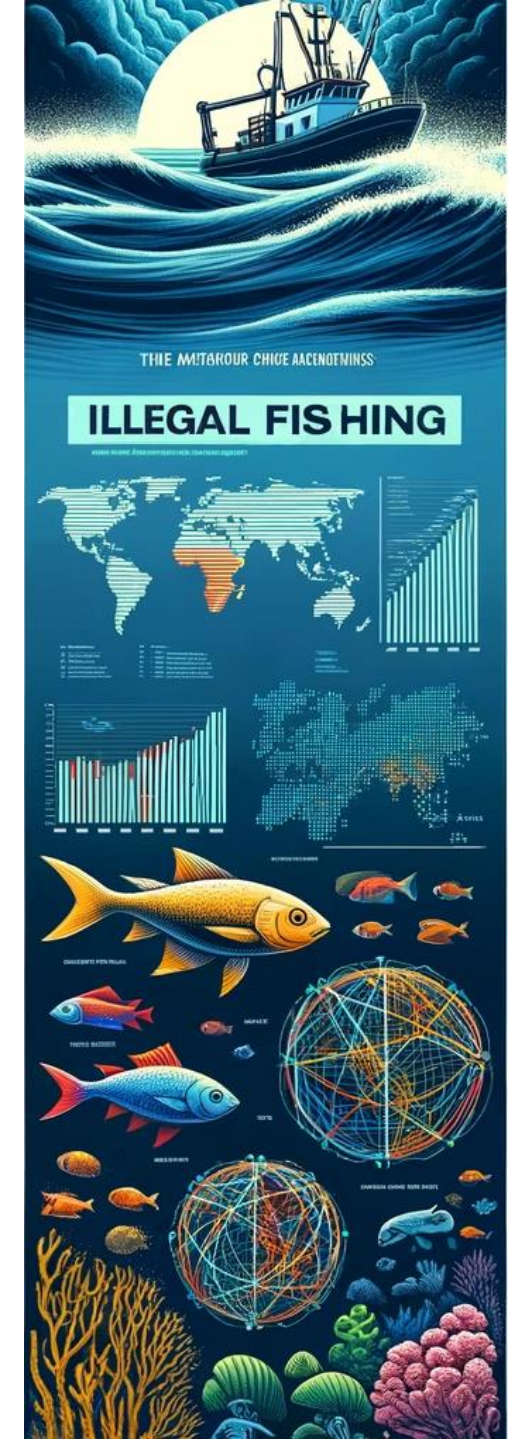
Topic 5: Sonar Imaging for Hydrothermal Systems

2024 IEEE SciVis Contest

This year's contest deals with the Visualization of Sonar Imaging data for Hydrothermal Systems. The data come from the COVIS - acoustic imaging method to detect hydrothermal discharge, quantify volume or areal fluxes, and estimate heat contents of discharge from deep sea hot springs. Example tasks:

- Extract and visualize plumes to effectively showcase changes in bending and structure

- Extract plume centerlines or otherwise quantify plume characteristics such as bending direction and degree, backscatter intensity gradients, and heat flux

- A more sophisticated gridding or plume extraction that starts from the raw data rather than gridded data

- Suitable for teams

- https://sciviscontest2024.github.io/

Topic 6: Might be Yours!

- **Let's discuss your own topic**