INF FAKULTÄT FÜR INFORMATIK

Visualization Exercises

Fakultät für Informatik | Institut für Simulation und Graphik
Otto-von-Guericke-Universität Magdeburg

Organizational

- For exercise dates and rooms, see LSF.
- The exercises take place in presence.
- Lecture slides and exercise sheets:
  - URL: https://www.vismd.de/teaching/visualization/
  - Password: vis_lecture
- Contact:


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Theoretical Exercises

- Beginning from the week of 11.11.24, you have to solve one exercise sheet each week and attend the exercise sessions. The sheets are listed on the VIS exercise page.

- Complete each sheet until your exercise session in the corresponding week (e.g., Exercise Sheet 1 until the 12.11.24 if you are in group 2 or 4).

- Before each exercise session, you are asked to **vote** for the tasks from the sheet in the **eLearning/Moodle**, i.e., to state which task solutions you would be able to present - each task yields one **votation point**.

- During the session, we request randomly selected students who have voted for a task to present it - if they fail to do so, they lose all votation points for that week. Every student should **present at least once** during the semester.

- The votation points are necessary to receive the **admission to the exam** at the end of the semester: You need to have at least **66%** of the votation points from the exercises, i.e., you need to have voted for at least 66% of the exercise tasks. In addition, you need to register for the exam in time.

Practical Part

- Every few exercise sessions, we will have a practical part where we use the coding notebook platform Observable to explore content from the lecture hands-on.
- The practical part will not require you to code. Rather you can interact with and explore visualizations and share your results with the group via Miro.
- Requirements:
  - No accounts need to be created at Observable or Miro.
  - **Please bring your laptop** to the exercises if you have one.
- The practical part does not count into the votation points.
- The links to the notebooks are listed on the VIS exercise page.
- Here is an example notebook for today: Notebook 0

Master Task

- Mandatory for master students to get 6 CP.

- Concept:
  - Search for a **dataset** online.
    - It must have at least **100 observations** and **5 attributes**.
  - Define 2 **analytical questions** that you want to answer based on the data.
  - Create **data visualizations** that answer your questions.

- You may work alone or in a group with up to 3 persons:
  - All persons inside a group work on the **same dataset**.
  - **Each person** inside the group has to define **two questions** and answer them.
    - E.g., in a group of 3 people you have a total of 6 questions to answer.

- Effort:
  - Plan enough time for the master task.
  - **1 CP = 30 hours**
  - Each person (in a group) should spend 30 hours on the solution!

Master Task – Example (Data)

- Some websites you can use for finding datasets are:
  - https://www.kaggle.com/datasets
  - https://www.tableau.com/learn/articles/free-public-data-sets

- -> You should **reference** your dataset/source!

- Example dataset: Netflix Original Films & IMDB Scores:

attributes

observations

Netflix Original Films & IMDB Scores as of 06/01/21

Title	Genre	Premiere	Runtime	IMDB Score	Language
Title of film	Genre(s) of film	Date the film premiered	Runtime in minutes	IMDB score as of 06/01/21	Language(s) of film as of 06/01/21
584 unique values	Documentary 27% Drama 13% Other (348) 60%	13Dec14 27May21	4 209	2.5 9	English 69% Hindi 6% Other (150) 26%
Enter the Anime	Documentary	August 5, 2019	58	2.5	English/Japanese
Dark Forces	Thriller	August 21, 2020	81	2.6	Spanish
The App	Science fiction/Drama	December 26, 2019	79	2.6	Italian
The Open House	Horror thriller	January 19, 2018	94	3.2	English
Kaali Khuhi	Mystery	October 30, 2020	90	3.4	Hindi
Drive	Action	November 1, 2019	147	3.5	Hindi

Master Task – Example (Analytical Questions)

- 2 analytical questions per person
  - Don’t make them too simple!
  - E.g., don’t simply search for min/max values or calculate averages/means

- 😕 Bad examples for Netflix Original Films & IMDB Scores:
  - What is the movie with the highest score?
  - What is the average score of horror movies?

- 🙂 Good examples for Netflix Original Films & IMDB Scores:
  - Which year had the most highly-ranked movies?
  - Are thrillers longer than action movies?
  - In which year did the most comedy films premiere?
  - What is the genre with the highest IMDB score?

Master Task – Example (Visualizations)

- Your visualizations should be sufficient to reasonably answer your analytical questions.

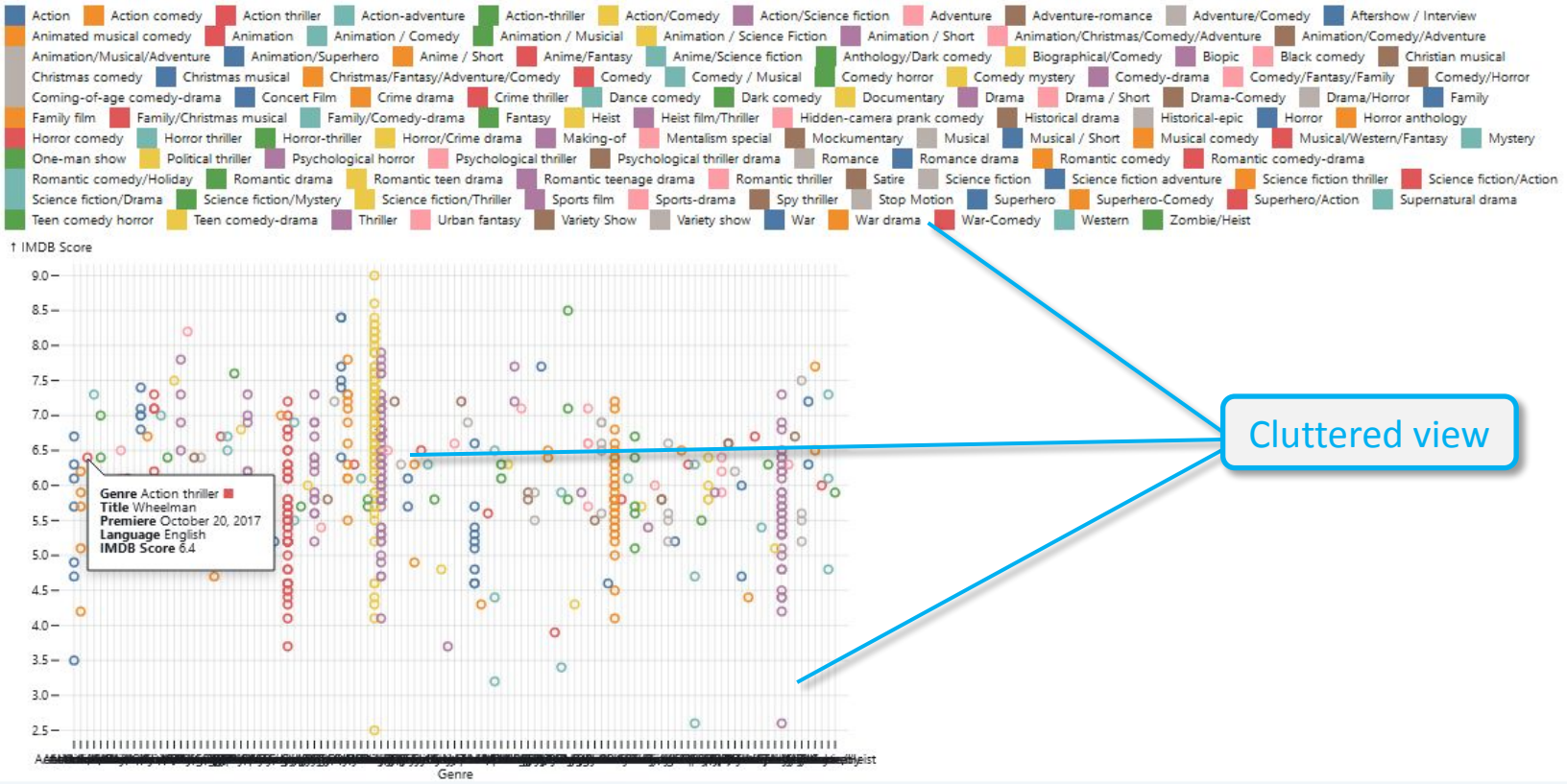
- The number of visualizations per question is up to you:
  - Only one visualizations with helpful interaction techniques might be sufficient.
  - Without interaction techniques, you might likely need multiple visualizations to investigate different aspects of your data.

- Think carefully about:
  - Colors used
  - Plot type used
    - Get inspired by https://datavizproject.com/ or https://r-graph-gallery.com/
  - Interaction methods (though it is not mandatory to include interaction methods)

- Find an example at: https://observablehq.com/@sarahmit/master-task
- You should use **another dataset**.
- You may use **similar plot types** if it suits your research questions.
  - Don’t just copy the notebook code but make your own visualization!

Master Task – Example (Visualizations: Bad Example)

- **What is the genre with the highest IMDB score?**

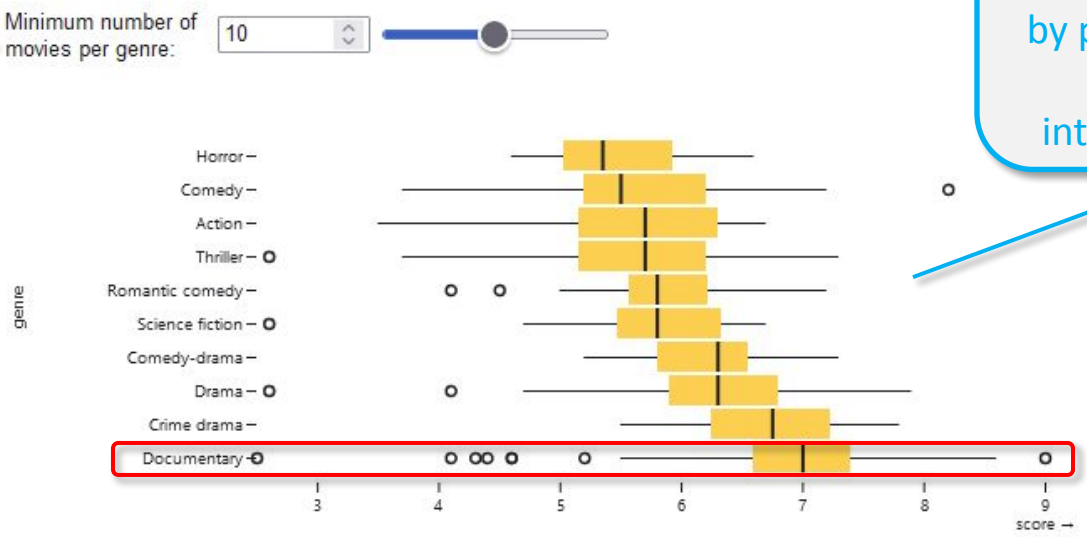


Master Task – Example (Visualizations: Good Example 1)

- **What is the genre with the highest IMDB score?**
  - **Documentary** is a promising candidate for the genre with the highest IMDB score!

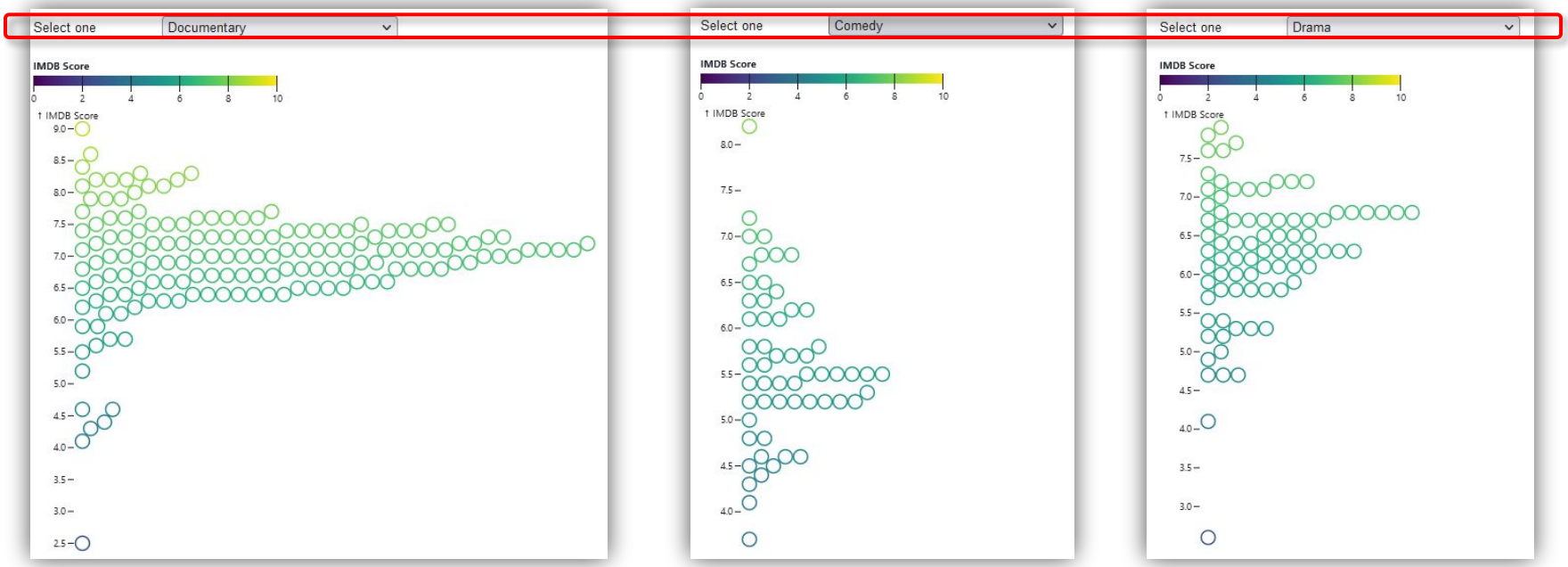
Plot type facilitates the comparison of the IMDB scores by genre by presenting mean, outliers, and interquartile range

Interaction option to filter the huge amount of genres



Master Task – Example (Visualizations: Good Example 2)

- **What is the genre with the highest IMDB score?**
  - Additional visualization to investigate the IMDB rating of individual movies of one **genre**.



Master Task – Which Tools To Use?

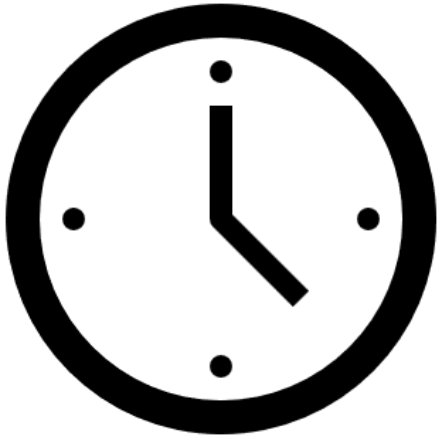
- You are free to use any tool or programming language/libraries.
  - E.g., JavaScript, Python, Tableau, Power BI, …

- During the semester, we will have a look at different interactive notebooks on ObservableHQ
  - We encourage you to try it out for the master task, too!
  - Many examples and tutorials can be found online

- Using the library D3.js you can also create advanced visualizations.
  - However, this is not required for the master task.

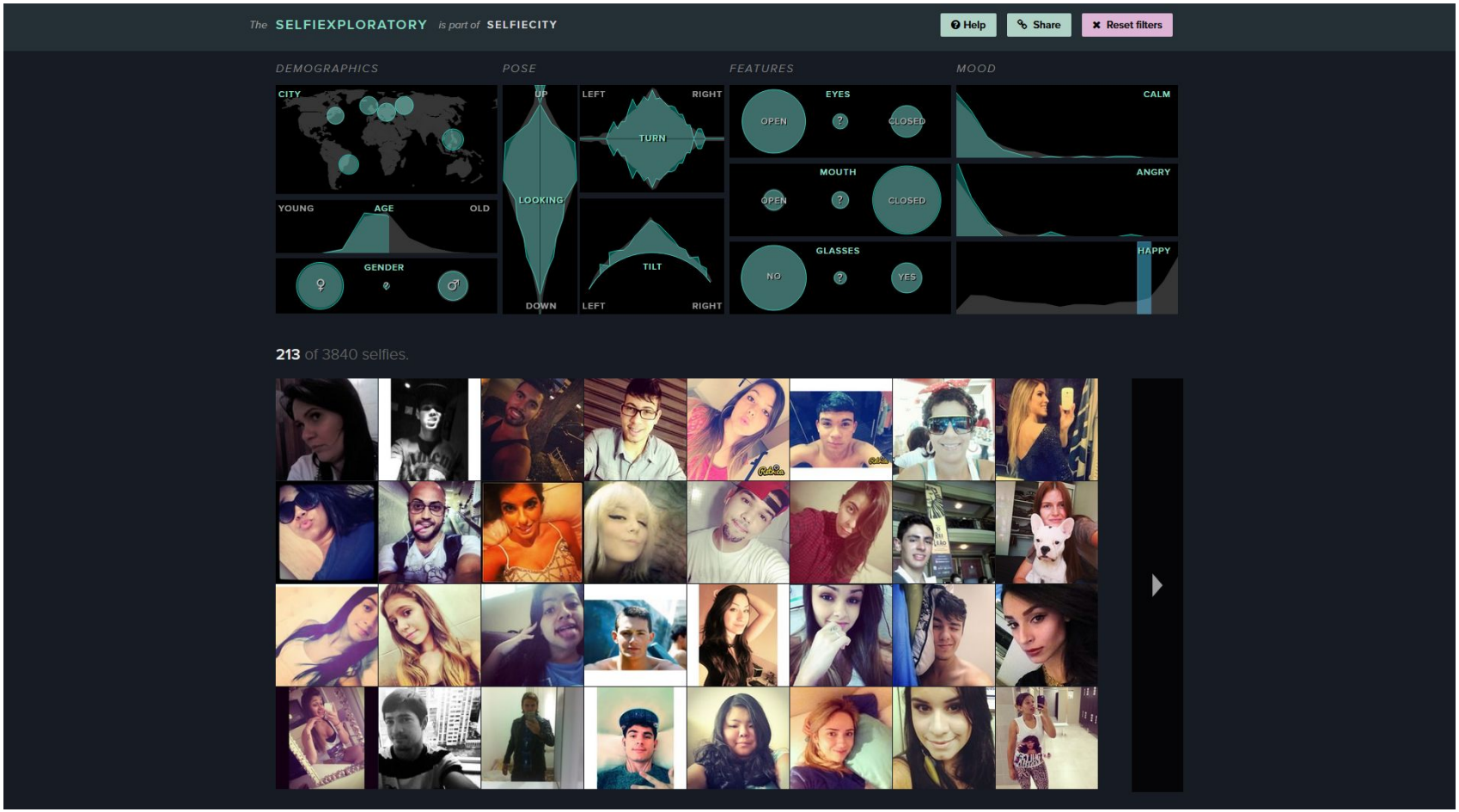
Master Task – How To Hand In?

- In the **last exercise session of this semester** (week of 27.01.24), you will have to present your results in front of the class, including:
  - A brief introduction to your dataset
  - Your analytical questions
  - Your visualizations and how you used them to answer your questions



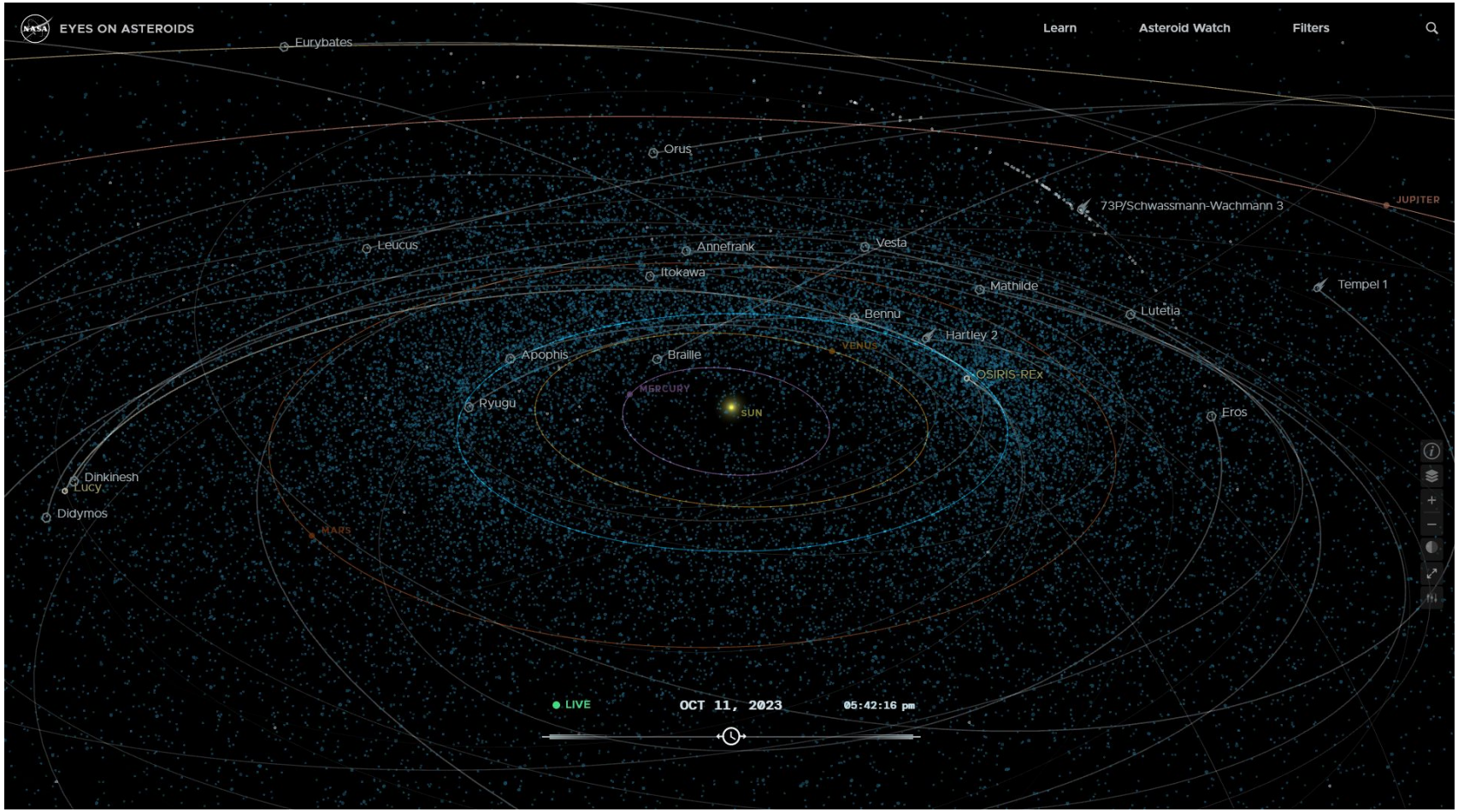
General Examples From: Visual Analytics

- [Selfiexploratory]



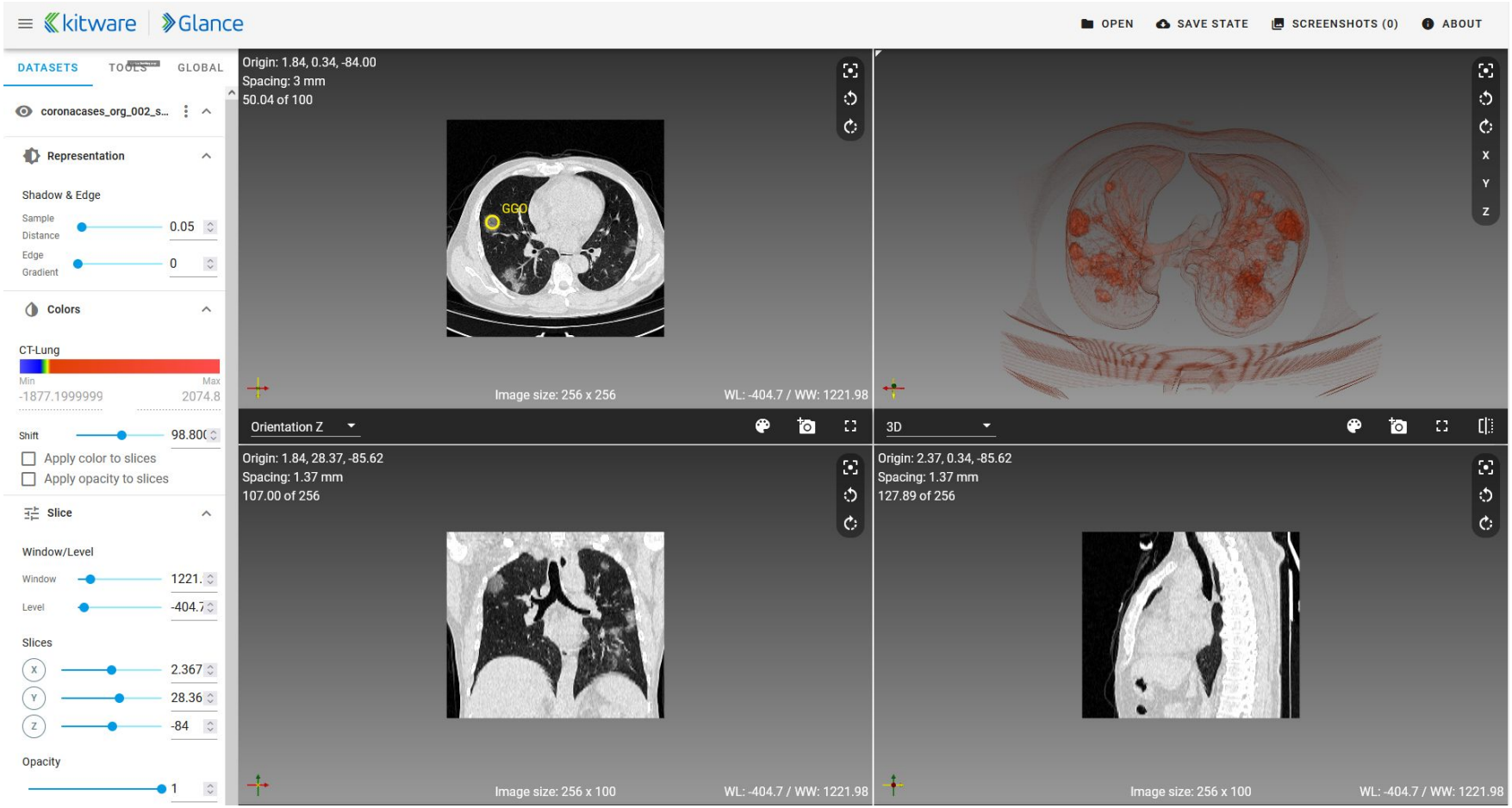
General Examples From: Scientific Visualization

- [Eyes on Asteroids - NASA]



General Examples From: (Scientific) Medical Visualization

- [Glance - kitware]



General Examples From: Narrative & Information Vis

- [Newspaper Article – ZEIT ONLINE]

Questions?

- Any questions regarding
  - The organization?
  - The theoretical exercises?
  - The practical parts?
  - The master task?