Submodule MIN-303-01 Visualization and HCI

Subheading	(MIN-VISH)
Person in Charge	Ahlers, Volker, Prof. Dr.
Language of Instruction	by agreement
Curriculum Allocation	MIN
Course Type, Contact Hours per Week	Lecture with exercise, 4 SWS
ECTS Credits	6
Contact Hours / Independent Study Hours	68 h / 112 h
Semester	2
Suggestions for Independent Study	see bibliography
Recommended Prerequisites	none
Examination	Written or oral examination, experimental work
Group Size	30

Learning Outcomes

Algorithmic and mathematical skills: Knowledge of the basic principles of human-computer interaction (HCI), understanding of visualization algorithms, knowledge of different types of data representation.
Analysis, design, and realization skills: Analysis of data sets and visualization requirements, design and realization of visualization solutions, implementation of algorithms.
Technological skills: Knowledge of the use of visualization techniques in different areas of application.
Methodological skills: Knowledge of the opportunities, the benefits, and the limits of the use of visualization techniques, detection of errors in visualization solutions.

Content

- Fundamentals: human-computer interaction (HCI), perception and cognition, gestalt laws, color models, data representation
- Scalar data: charts (e.g., line charts, bar charts, scatter plots, histograms), color coding, contour lines, multi-variate data
- Volume data: isosurfaces, volume rendering, ray casting
- Vector fields: glyphs, flow lines, flow paths Relations: visualization of hierarchies (trees) and networks (graphs), e.g., tree map, force-directed layout
- Software: Current visualization libraries and graphical development environments, application to real data

Requirements for Contact Hours

Active participation, solving exercise problems, project work

Requirements for Independent Study Hours

Preparation and review of the lectures, reading literature

Bibliography

Lecture notes
Telea, A.C.: Data Visualization, CRC Press
Munzner, T.: Visualization Analysis & Design, CRC Press
Ward, M., Grinstein, G.G., Keim, D.: Interactive Data Visualization. CRC Press
Ware, C.: Information Visualization. Morgan Kaufmann