Datenanalyse, Visualisierung und Visual Analytics

Sommer

(engl. Data Analysis, Visualization and Visual Analytics)

Modulnummer: FIN-INF-110388

Kürzel	CP	Semester	Fachsem.	Dauer	Sprache	Niveau
DatenVisVA	5	Sommer	starting at 4.	1 Semester	deutsch	Bachelor

Link zum LSF:	LSF
Zugang beschränkt:	
Verantwortung:	Holger Theisel
Dozent:in:	Dirk Joachim Lehmann
Lehrveranstaltungen:	Vorlesung *Datenanalyse, Visualisierung und Visual Analytics*
Verwendbarkeit:	- B.Sc. INF: Informatik - Wahlpflicht - B.Sc. INF: Informatik Wahlpflicht (SPO 2027) - B.Sc. CV: Computervisualistik - Wahlpflicht - B.Sc. CV: Computervisualistik Wahlpflicht (SPO 2027) - B.Sc. INGINF: Informatik - Wahlpflicht - B.Sc. INGINF: Informatik Wahlpflicht (SPO 2027) - B.Sc. WIF: Gestalten und Anwenden - Wahlpflicht - B.Sc. WIF: Informatik Wahlpflicht (SPO 2027) - B.Sc. INF (bilingual): Informatik - Wahlpflicht - B.Sc. INF (bilingual): Informatik Wahlpflicht (SPO 2027)

Angestrebte Lernergebnisse:
The students ...

- know methods of data analysis, visualization and visual analytics, including algorithmic methods for data preparation, dimension reduction and cluster analysis.

- know visualization techniques for the representation of high-dimensional data and interactive visual analytics approaches for decision support.
- know cognitive and perceptual psychological aspects of data visualization as well as principles of effective graphical representations.
- are able to select, apply and interpret suitable methods and tools for the analysis and visualization of complex data sets.
- are able to technically implement and evaluate visualization and analysis models and integrate them into suitable applications.
- are able to critically evaluate and optimize the quality and informative value of data visualizations and analytical models.
- are able to independently develop and present data-based solutions for simple problems from the application.

Inhalt:
Contents of the course:

- Automated data analysis: Introduction to machine learning and statistical methods for data analysis and their mathematical foundations (especially in multivariate optimization). Techniques covered include PCA for dimension reduction, k-means for clustering and regression analysis for modeling correlations and much more.
- Data visualization: Methods for graphical representation of data to identify patterns and trends, including scatterplots, heatmaps and parallel coordinates.
- Visual analytics: Combination of data mining methods and interactive visualizations for the analysis of complex data sets. Use of dashboards and reporting tools to support decision-making.
- Interdisciplinary aspects: Influence of visual perception and cognitive processing on effective visualizations. Consideration of color theory, design principles and usability.
- Application examples: Practical applications from financial data analysis, bioinformatics and epidemiology, for example for disease monitoring or gene expression analysis.
- The course combines theory and practical application scenarios to prepare students for independent data analysis and visualization tasks.

Arbeitsaufwand:
30 h attendance time + 120 h independent work

Prüfungsvorleistungen:	Studien-/Prüfungsleistungen:	Lehrform / SWS:
	Written examination, 120 min	2 SWS Lecture

Voraussetzungen nach Prüfungsordnung:	Empfohlene Voraussetzungen:
none	

Medienformen:	Literatur:

Hinweise:

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