What Happens at Dagstuhl?
Uncovering Patterns through Visualization

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Motivation

Schloss Dagstuhl is a well-known venue for computer science meetings. In particular, Dagstuhl Seminars cover any topic that is related to computer science and focus on the exchange and development of ideas. Usually, a seminar is lead by a group of experienced senior scientists with up to 40 participants. Seminars are known for establishing new directions by bringing together separate fields or even scientific disciplines.
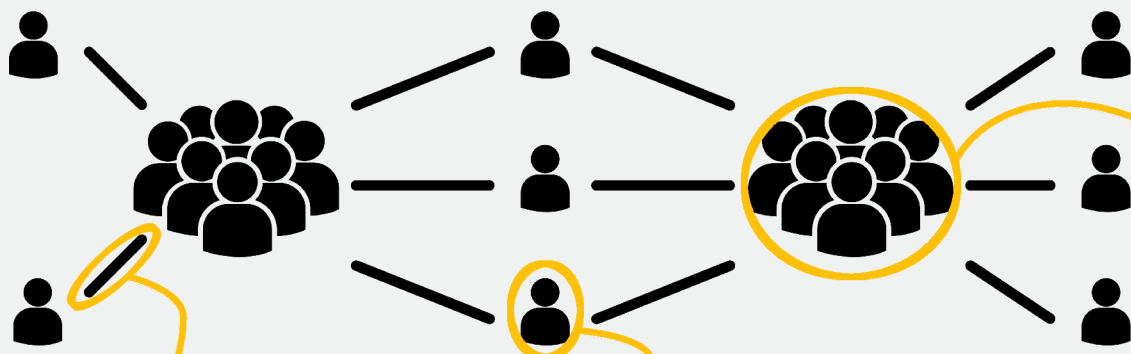
Analyzing publicly available data about seminar topics and participants over the years has (at least) two potential benefits:

(1) Revealing important patterns and trends in computer science

(2) Witnessing the impact of such meetings in terms of productivity and cross contamination among different scientific communities

The Graph

We queried publicly available information of all events and their associated participants from the Dagstuhl website and modelled the data as a bipartite graph. We filtered for Dagstuhl seminars after 2005 which yielded 980 event and 18876 participant vertices with 34854 edges. Vertices and edges contain additional data attributes as shown below.

Event Type:	Seminar	Number:	23051
Title:	Perception in Network Visualization		
Date:	29. Jan. 2023 - 03. Feb. 2023		
Motivation:	Networks are used to represent a large variety of data in many application areas from life sciences to social sciences. (...)		
Summary:	Seminars usually have a summary after some time.		
Impacts:	arxiv.org/abs/1608.03123 (...)		
Publications:	doi.org/10.4230/DagRep.6.2.1(...)		
Classification:	Data Structures and Algorithms; Human-Computer Interaction		
Key Phrases:	Network Visualization; Graph Drawing; Perception; Cognition		

Is Organizer: False
In-Person: True
Institute: TU Wien
Country: Austria

Name: Markus Wallinger
DBLP: dblp.org/pid/273/3939.html

Preprocessing Code and different variants in .graphml are available:
github.com/mwallinger-tu/dagstuhl-network

The System

We created an interactive web-based prototype application to facilitate exploration of the network. The layout is driven by the key phrases associated with each seminar. We first use a pretrained sentence transformer to assign each key phrase to a position in a high dimensional space. Each seminar is placed in this space as the barycenter of its key phrases. From this high dimensional representation, we apply the UMAP dimension reduction algorithm. Though initially hidden in the visualization, participants's positions in the drawing are computed as the barycenter of their attended seminars.

A two-level hierarchical clustering of the embedded seminars partitions the data into five top-level clusters. Each of these five clusters are then further partitioned into sub-clusters which represent more narrow topics. These clusters are represented visually using a map metaphor similar to GMap.

Following this map metaphor we provide several possibilities to interactively explore the data.

Seminar layout computed by embedding key phrases followed by dimensionality reduction.

A search bar and timeline help to further filter for specific seminars or people

Zooming in reveals finer clusters

Clicking a seminar embeds participants

Dragging and zooming keeps the semantic embedding of participants

DBLP information to show collaboration before and after a seminar

Zooming further shows seminar labels

Use the system to find yourself or seminars you have attended!
ac.tuwien.ac.at/projects/dagstuhl-network