Visual Analytics E193-07

Presented by Natkamon Tovanich / Wintergraph 2026

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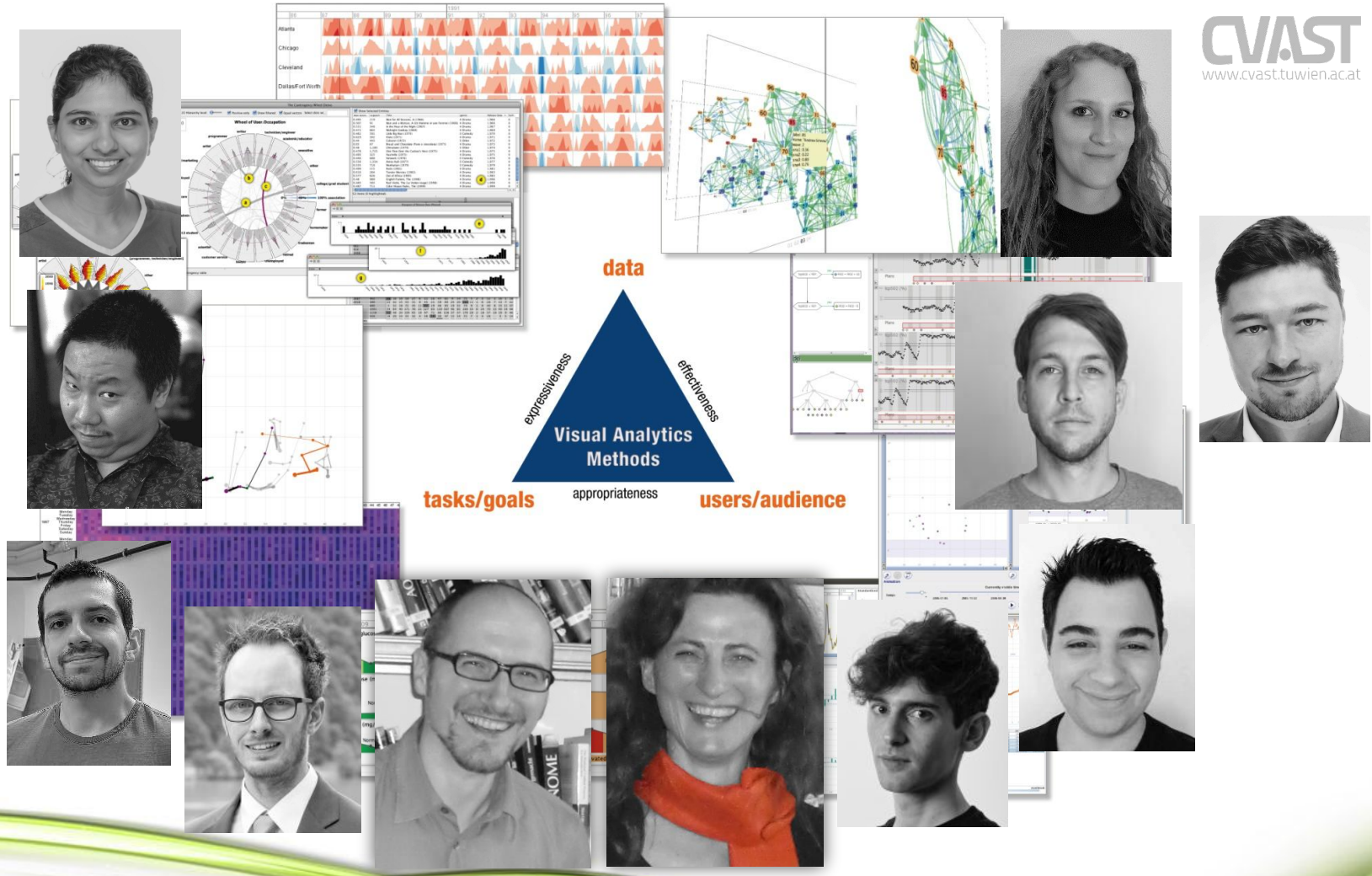
TU WIEN Informatics



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Research Foci

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Visualization & Visual Analytics (VA)

Knowledge-Assisted VA, Guidance, Data & Uncertainty Analysis

Graph Drawing & Network Visualization

Dynamic & Large Network Visualization

Spatial & Time-oriented Visualization

Segmentation, Dimension Reduction, Parameter Space Analysis

Set & Ensemble Visualization

Ongoing Projects

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ArtVis Dynamic Network Perspectives on Digital Art History

In order to better understand the history of art a major challenge of Digital Art History (DAH) is to understand how the components of the art system (persons, objects, places, institutions, and events) interacted with each other and how these interactions vary over time. The aim of our project is to model such complex relations through the use of Network Visualization (NetVis). Networks have a wide range of application in many domains, including social sciences, software engineering, and economics.

KAVis: Visual Interactive Space-Time Segmentation

Many application domains generate and analyze multivariate spatial time series and often face data quality issues. Segmentations are very useful for exploratory analysis of these varying data characteristics, but appropriate segmentations are currently challenging or frequently impossible. The project aims to integrate background and domain knowledge within a VA process to provide knowledge-assisted interactive segmentation of such multivariate spatial time series and deal with data quality issues (e.g., missing and uncertain values).

SANE: ViSual ANalytics for Event-based Diffusion on Networks

We strive to systematically characterize the topic in the visualization research community, developing a common framework to foster research in the area. We will then employ such framework to introduce and refine prototypes to analyze real data about diffusion phenomena, improving current algorithmic solutions, and sharing best practices and lessons learned throughout the project duration.

Visual Analytics and Computer Vision Meet Cultural Heritage

Collections of **digitized cultural artifacts** offer immense potential to increase the knowledge of our heritage. However, the systematic analysis and presentation of historical photographs and amateur films are still strongly limited. This impedes the analysis, interpretation, and subsequent preservation of human cultural history.

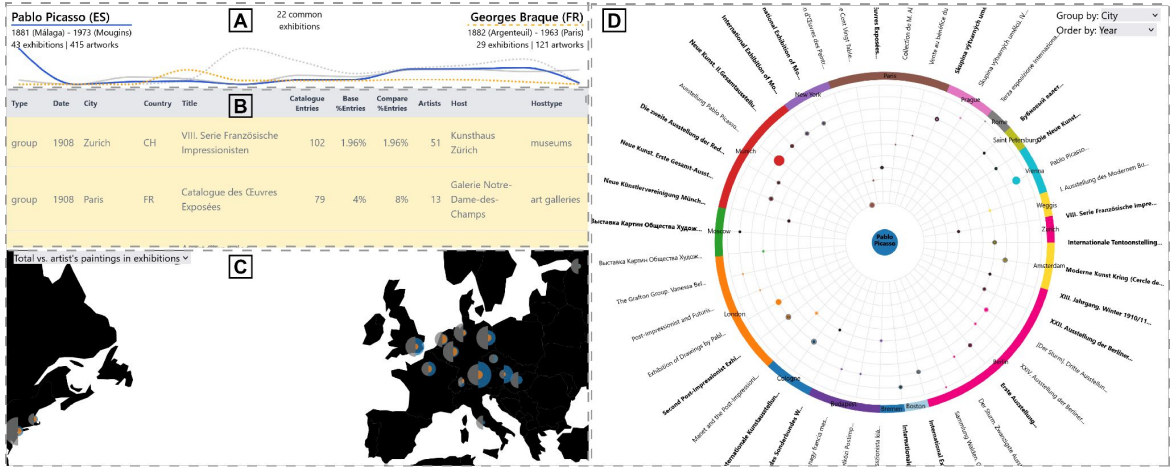
Bilateral Artificial Intelligence

FWF Cluster of Excellence

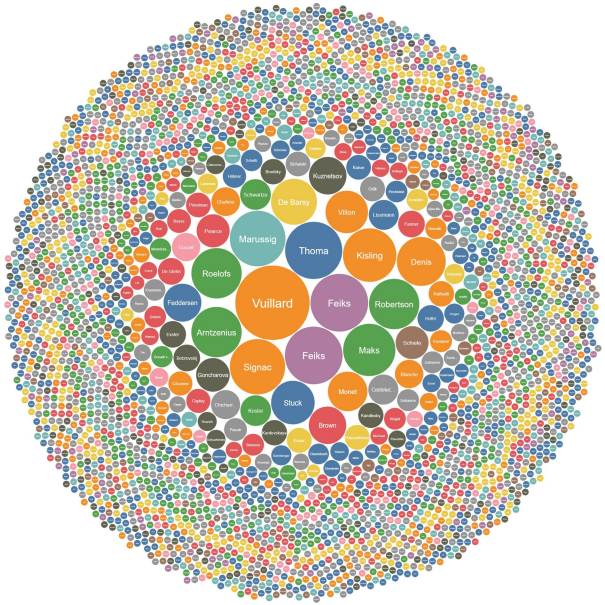
Combining sub-symbolic AI (machine learning) and symbolic AI (knowledge representation and reasoning)

ArtVis

Dynamic Network Perspectives on Digital Art History



Mapping the Avantgarde: Visualizing Modern Artists' Exhibition Activity *(EuroVis 2024)*



A Kaleidoscopic View of Artist Co-Exhibition Networks *(IEEE VIS 2025)*

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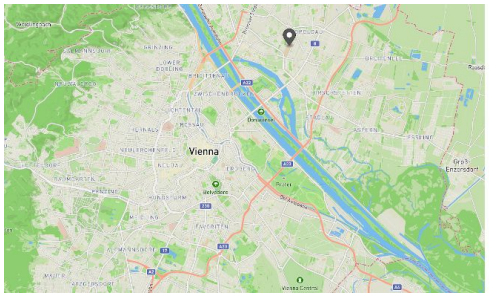
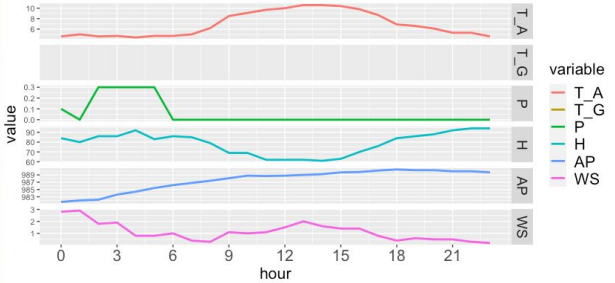
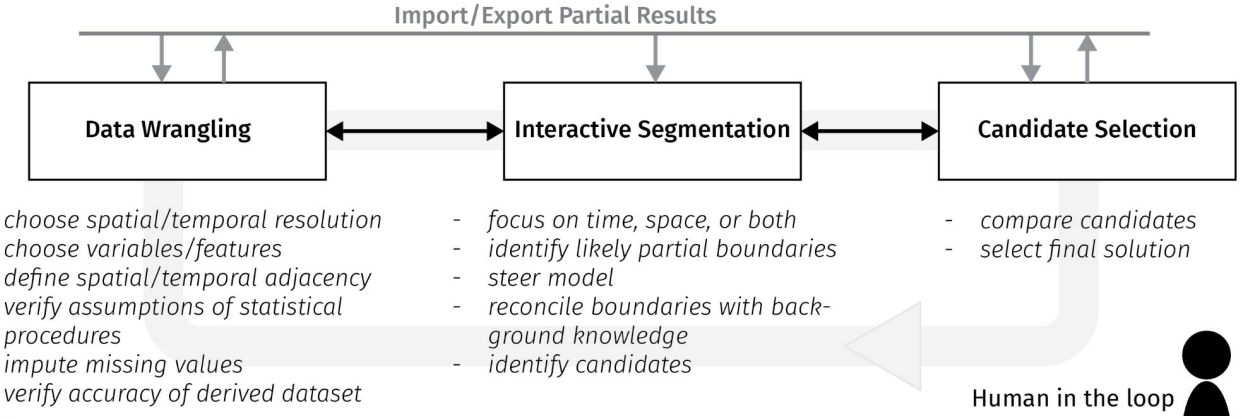
KAVIS

Visual Interactive Space-Time Segmentation







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SANE

Visual Analytics for Event-based Diffusion on Networks

Visual Analytics for studying and communicating information diffusion processes over networks

Tackling the dynamic and stochastic nature of diffusion processes in real-world scenarios

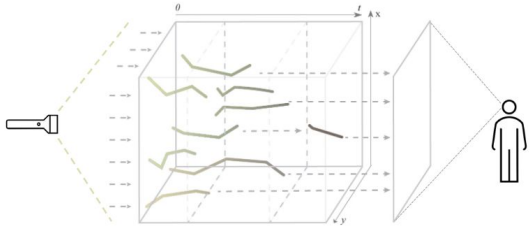
⬅️ Don't Stop Me Now: Visualizing Disruptions in Railroad Networks *(IEEE VIS 2025)*

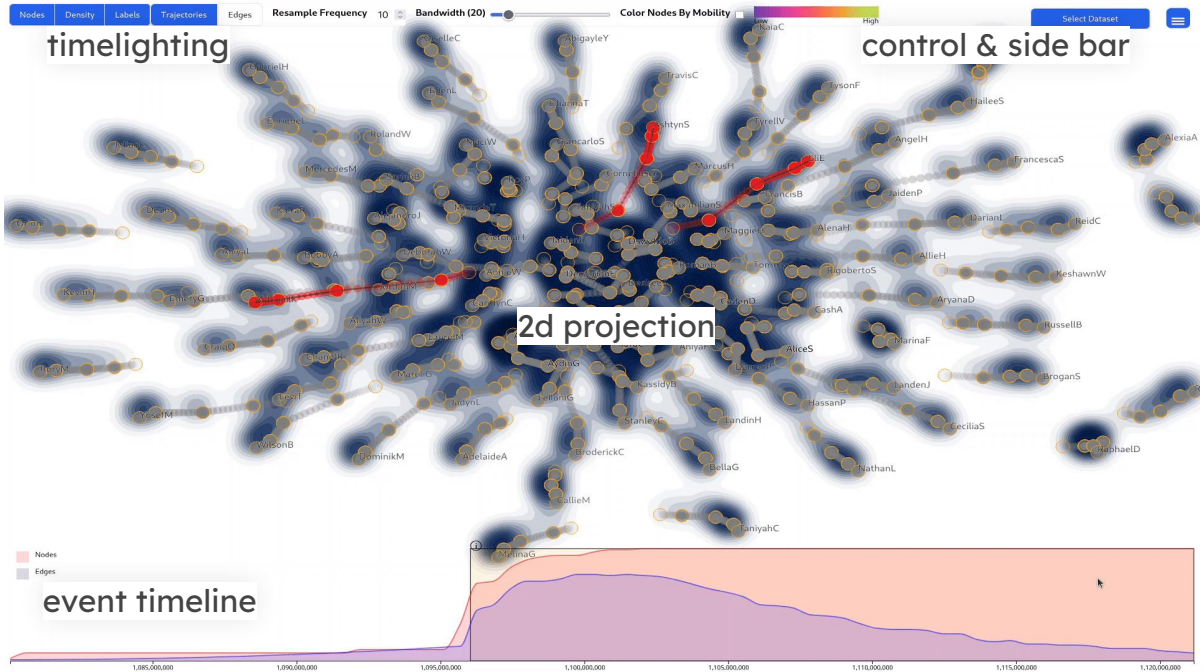



TimeLighting

Temporal Network Projections

Projecting event-based networks
so rays of time carry node and edge
activity through a space–time cube
revealing dynamics & patterns





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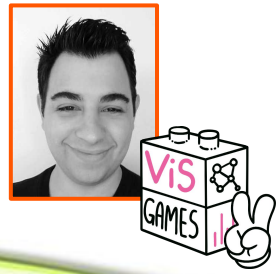

Bilateral AI

BilAI
Bilateral
Artificial
Intelligence

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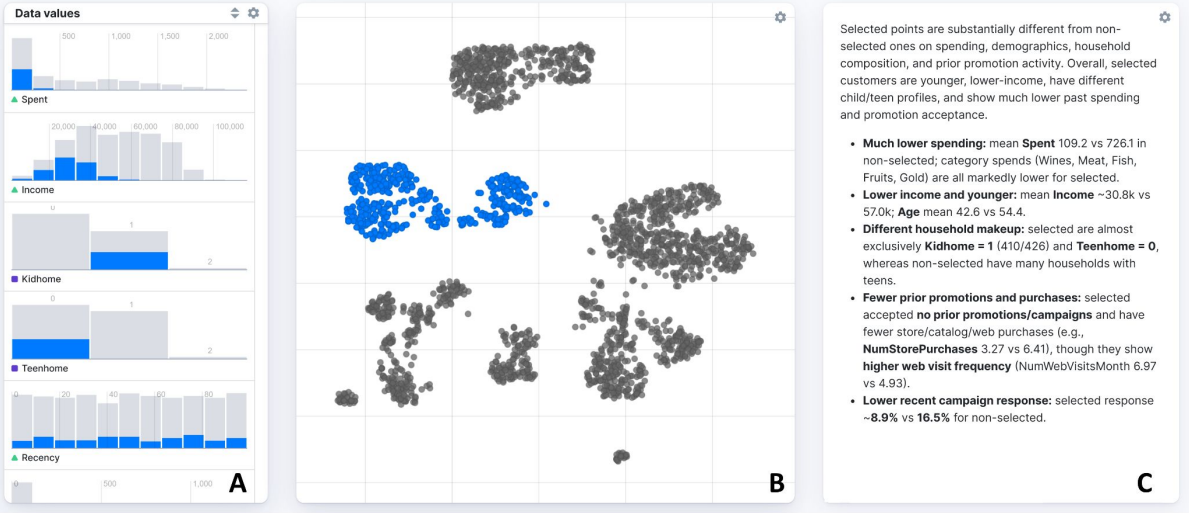
Combining sub-symbolic AI (machine learning) and symbolic AI (knowledge representation and reasoning)

FWF Cluster of Excellence

Intersection of Visual Analytics with graph-based structures like Knowledge Graphs (KGs), causal representation learning, and causal reasoning

Interactive Cluster Descriptions through ➡️ Large Language Model (LLM) Explanation



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Universität Klagenfurt
JKU Johannes Kepler Universität Linz
TU Wien Technische Universität Wien
WU Wirtschaftsuniversität Wien Vienna University of Economics and Business

Visualization of Blockchain Data

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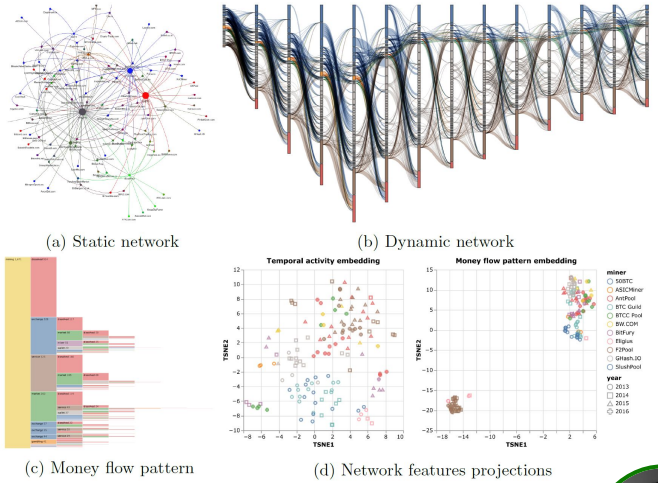
Blockchains provide transparent, publicly accessible records of all transactions, creating large-scale temporal networks. Yet, these complex and heterogeneous networks are challenging to understand and analyze.

💡 Research Topics

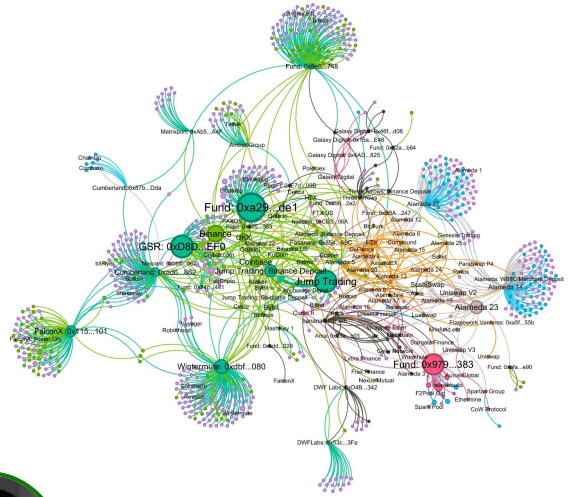
- Money Flow Visualizations
- Decentralize Finance (DeFi) Protocol Dashboards
- Systemic Risk Analysis and Monitoring



(a) Static network (b) Dynamic network

(c) Money flow pattern (d) Network features projections

Bitcoin Money Flow Visualization



Ethereum Account Network

FairOnChain

BLOCKCHAIN @POLYTECHNIQUE