

CHIST-ERA Projects Seminar

Cross Topics

Topic VADMU - Start 2018

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Visual Analytics

Decision Making under Uncertainty

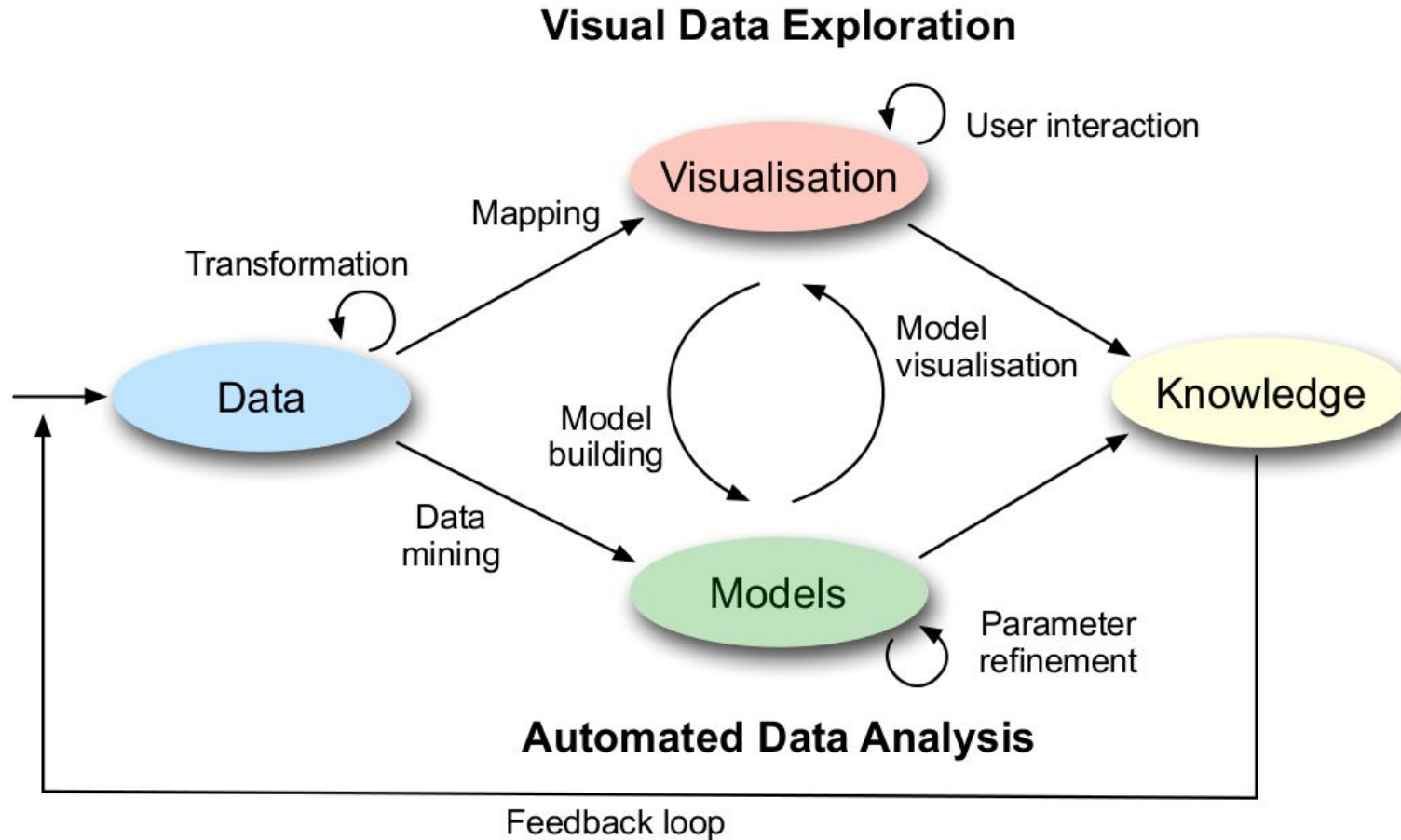
When data has uncertainty and decisions should be made, humans are required

- ❖ **Exploration, interaction, visualization, to understand the results of analyses and nature of uncertainty**
- ❖ **Low latency for algorithms to fit the human capabilities**
 - ✓ Fast algorithms, or approximate results, or progressive results
- ❖ **New lines of methods for data analysis at scale under uncertainty**



Visual Analytics

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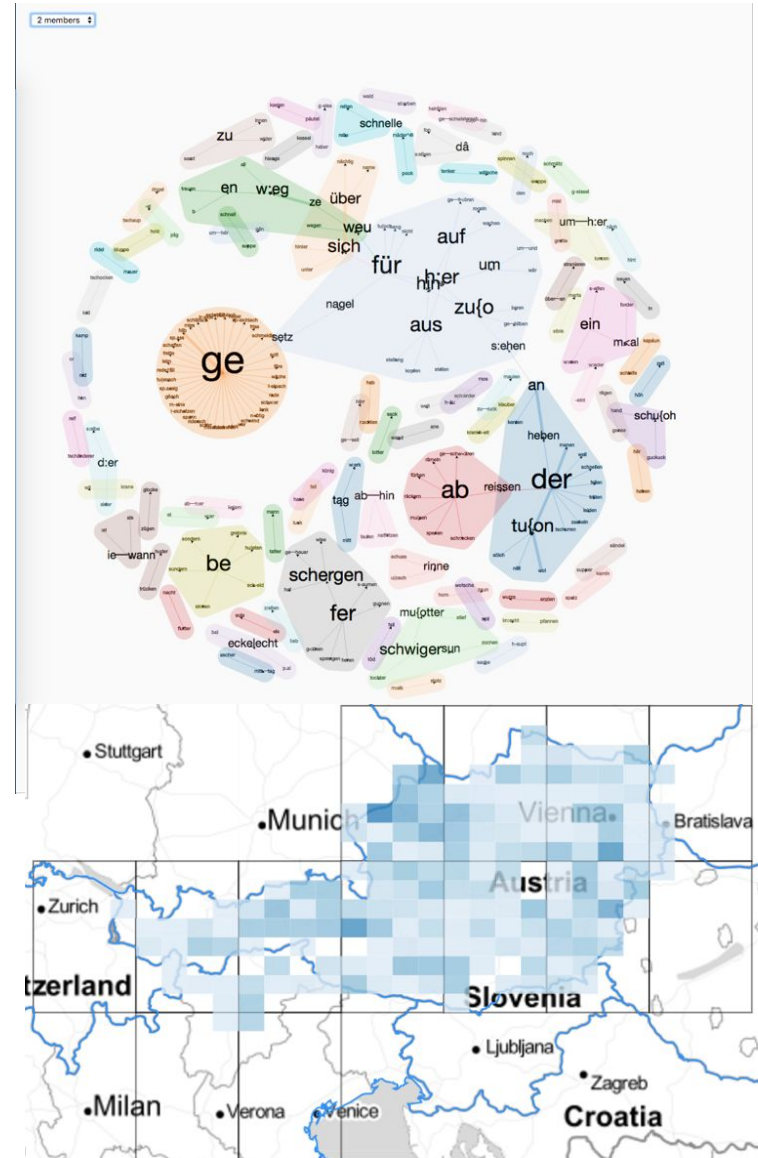
Visual Analytics for Decision Making under Uncertainty

- ◆ **PROVIDEDH: PROgressive Visual DEcision-making for Digital Humanities**
 - ✓ Provide visual interactive tools that convey the degree of uncertainty of the datasets and computational models used behind, designed to progressively adapt the visualizations to incorporate the new, more complete or more accurate data.
- ◆ **IVAN: Interactive and Visual Analysis of Networks**
 - ✓ Create a visual analysis system for the exploration of dynamic or time-dependent networks, in particular using modern clustering methods.

PROVIDEDH: PROgressive VIsual
DEcision-making for Digital Humanities

Partners

- ✓ University of Salamanca (SPAIN)
 - **PI and Consortium Coordinator: Roberto Therón**
- ✓ Austrian Academy of Sciences (AUSTRIA)
 - **PI: Eveline Wandl-Vogt**
- ✓ Trinity College Dublin, Faculty of Arts Humanities and Social Sciences (IRELAND)
 - **PI: Jennifer Edmond**
- ✓ Poznan Supercomputing and Networking Center (POLAND)
 - **PI: Cezary Mazurek**



❖ **Two key scientific questions**

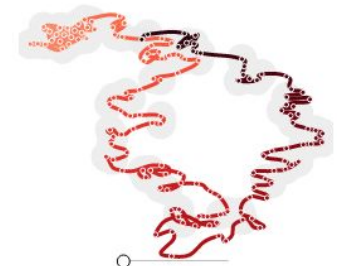
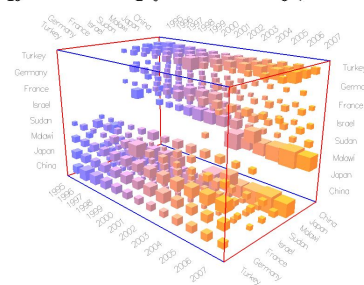
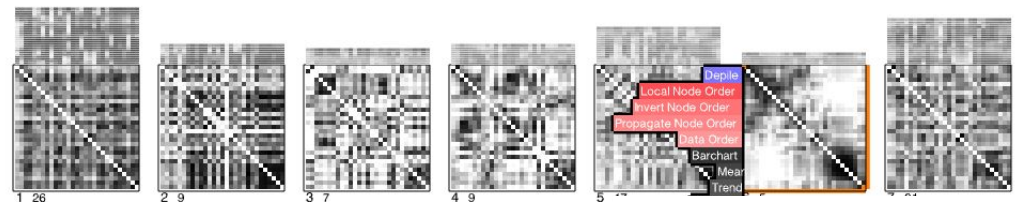
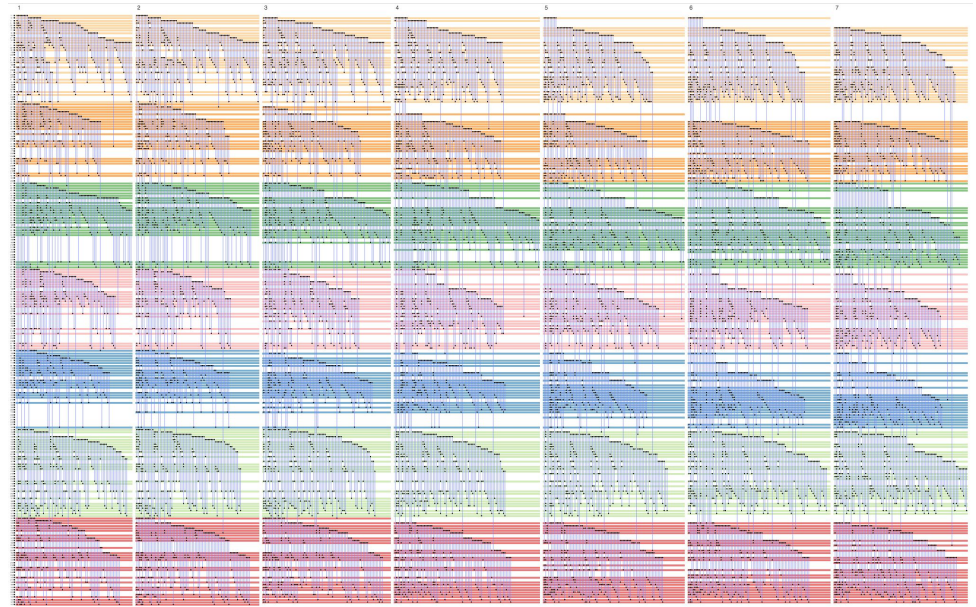
- ✓ Is it possible to assess and track the degree of uncertainty of DH datasets, and how they are affected when different computational models are applied to them?
- ✓ Is it possible to convey this evolution of uncertainty with interactive multimodal interfaces that progressively adapt to the moment of decision-making?

❖ **Key challenges**

- ✓ Categorise all sources of uncertainty that can affect DH
- ✓ Develop a set of metrics for the degree of uncertainty propose a (software) framework that makes use it
- ✓ Clarify what DH tasks need decision-making and build a pipeline oriented towards the handling of uncertainty

◆ IVAN: Interactive and Visual Analysis of Networks

- ✓ Torsten Möller, Univ. Vienna, Austria
- ✓ Jean-Daniel Fekete, Inria, France
- ✓ Dimitri Van De Ville, EPFL, Switzerland





Background

- Dynamic Networks are used in many scientific domains, such as
 - neurobiology to model the evolution of the brain according to signals (EEG, fMRI)
 - Social sciences to model the evolution of social ties according to documents or sites
- Clustering these networks is important to find regularities, invariants, better understand them, and achieve scalable analysis

Key Challenges

- Development of harmonic analysis for graphs
 - Spectral methods and graph wavelet transforms, hard to understand and to harness
- Facilitate interactive exploration, verification, assess uncertainty related to the computation of clusterings on graphs
- Clustering sets of networks and clustered networks
- Maintain hundreds of clusterings and explore them to understand their variety
- Understanding the needs and user tasks across different communities
- Need for computationally efficient methods

Possible roadmap

Questions ?