

Wednesday: (Geo-)Visual Analytics

Learning objectives of the day:

- 1) How to identify and reduce sample bias in visualizations of VGI?
- 2) What is the most appropriate aggregation and clustering approach for my specific context of application?

Vison talk:

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Abstract

Wednesday's learning objectives are dedicated to the challenges when working with VGI data. How is it possible to avoid biased visualizations? What techniques must be employed to extract meaningful and valid information from large but noisy spatio-temporal Location Based Social Media datasets? The Keynote and Lectures I and II directly relate to these questions. The two exercises will allow participants to see the methods in application and ask questions.

Keywords: *spatio-temporal, bias, clustering, landscape planning*

I. KEYNOTE

Visual Analytics of VGI requires fundamentally different approaches, compared to traditional data, to extract valid information from large noisy and, to some degree, biased datasets. What are current research objectives and what are future challenges to be solved in the context of VGI and (Geo-)Visual Analytics? Prof. Alan MacEachren will introduce this summer school day with a Vison talk on current objectives.

II. LECTURES

A. *Lecture 1:*

The first lecture by Natalia & Gennady Andrienko will focus on general methods for data processing and aggregation, and in particular on transformation and clustering of spatio-temporal data, both for historical and streaming data. Major data representations such as events, time series, trajectories and situations, will be considered, together with relevant transformations between the representations. Cluster analysis methods suitable for different representations will be demonstrated using large real-world and real-time spatio-temporal datasets.

B. *Lecture 2:*

The second the lecture by Steffen Koch will focus on interactive methods for efficiently accessing and analyzing VGI visually. The lecture covers direct interaction methods on spatial data as well as associated information shown in linked perspectives. Examples will be given on how to combine visual

and spatial cues to support users during interactive analysis sessions. Exploratory and confirmatory techniques will be discussed as well as ideas on how to integrate them into a coherent interactive analysis workflow.

C. *Lecture 3:*

The third lecture of the day by Alexander Dunkel will focus on application driven approaches to visualization of VGI, focusing on visualization of social media data for application to the fields of landscape and urban planning. Different visualization techniques will be presented that allow planners to study and identify perceived characteristics and the collective attribution of values and meaning by users.

III. EXERCISES (SUMMARY)

Two exercises will be held Wednesday afternoon, allowing participants to get an in-depth view into particular data processing approaches.

A. *Data transformation and clustering with V-Analytics*

The first exercise held by Natalia and Gennady Andrienko demonstrates data processing and clustering, utilizing functions from V-Analytics, an in-house developed visual analytics software system. Requirements:

- V-Analytics download: <http://geoanalytics.net/V-Analytics/>
- Windows/ (Mac) or Virtual Environment

B. *Flickr Tag Map Generation*

During the second exercise, Alexander Dunkel guides participants through the generation of [Flickr Tag Maps](#), a specific technique for spatio-temporal clustering of photo locations and tags. Requirements:

- Workshop files, available [here](#)
- Will be held in TUD Computer-Pool [R590](#)

C. *Optional Third Exercise by Steffen Koch*