Geographic Data Science

15 Guest Editors’ Introduction
Gennady Andrienko, Natalia Andrienko, and Robert Weibel
Data science methods and approaches address all stages of the transition from data to knowledge and action. Visualization of this data is essential for human understanding of the subject under study, analytical reasoning about it, and generating new knowledge. Geographic data science deals with data that incorporates spatial and, often, temporal elements. The articles selected for this special issue represent a mix of theoretical approaches and novel applications of geographic data science.

18 Typology of Uncertainty in Static Geolocated Graphs for Visualization
Tatiana von Landesberger, Sebastian Bremm, and Marcel Wunderlich
Static geolocated graphs have nodes connected by edges that can have geographic location and associated attributes. This article proposes a typology of uncertainty in static geolocated graphs, which can affect the existence, location, attributes, or grouping of nodes and edges. The authors also summarize available techniques for visualizing such uncertainty.

28 ANALYTIC: An Active Learning System for Trajectory Classification
Amílcar Soares Júnior, Chiara Renso, and Stan Matwin
Machine-learning algorithms can help to infer semantic annotations from trajectory data by learning from sets of labeled data. Specifically, active learning approaches can minimize the set of trajectories to be annotated while preserving good performance measures. The ANALYTIC web-based interactive tool visually guides users through this annotation process.

40 Impact of Spatial Scales on the Intercomparison of Climate Scenarios
Wei Luo, Michael Steptoe, Zheng Chang, Robert Link, Leon Clarke, and Ross Maciejevski
Intercomparison and similarity analysis of different climate scenarios based on multiple simulation runs remain challenging. The proposed visual analytics system lets users perform similarity analysis of climate scenarios from the Global Change Assessment Model at world, continental, and country scales over time.

Alireza Karduni, Isaac Cho, Ginette Wessel, William Ribarsky, Eric Sauda, and WenwenDou
The study of human activity in cities is integral to urban planning, design, and transit management. The Urban Space Explorer visual analytics system uses mobile social media that combines geolocation with temporal and semantic data to enable interactive exploration of public-space-related activity.

Cover Art: © 2017 Kelly Lanphier.
Name Profiler Toolkit
Feng Wang, Brett Hansen, Ryan Simmons, and Ross Maciejewski

The Name Profiler Toolkit is a visual analytics system designed to enable the interactive exploration and analysis of forename and surname geographical distributions across the United States. Using demographic data from the US Census Bureau and Zillow, the toolkit lets users interactively compare distributions of names and name attributes.

Feature Article

Terrain Model Reconstruction from Terrestrial LiDAR Data Using Radial Basis Functions
Jules Morel, Alexandra Bac, and Cédric Véga

The presence of vegetation and the terrain topography generate strong occlusions that cause large gaps in terrestrial laser scanning (TLS) data at the ground level. This article introduces a surface-approximation algorithm that can reconstruct detailed digital terrain models (DTMs) from TLS data under forest canopies.

Departments

About the Cover
Illuminating Nature
Gary Singh

Art on Graphics
Coming Into Focus: An Interview with Ellen Jantzen
Bruce D. Campbell and Francesca Samsel

Education
Making Together: An Interdisciplinary, Inter-institutional Assistive-Technology Project
Susan Reiser, Rebecca Bruce, Jackson Martin, and Brent Skidmore

Spatial Interfaces
Compressing VR: Fitting Large Virtual Environments within Limited Physical Space
Khrystyna Vasylevska and Hannes Kaufmann

Graphically Speaking
Beautiful Math, Part 6: Visualizing 4D Regular Polytopes Using the Kaleidoscope Principle
Peichang Ouyang, Xinchang Wang, and Yongman Zhao

Applications
Visual Analytics for Spatial Clusters of Air-Quality Data
Zhiguang Zhou, Zhifei Ye, Yanan Liu, Fang Liu, Yubo Tao, and Weihua Su

Visualization Viewpoints
How Visualization Can Foster Diversity and Inclusion in Next-Generation Science
Kelly Gaither

Computer Society Information, p. 17
CG&A Call for Papers, inside back cover