Overview of IUI2018 Workshop: User Interfaces for Spatial and Temporal Data Analysis (UISTDA2018)

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ABSTRACT

Nowadays, humanity generates and contributes to form large and complex datasets, going from documents published on media outlets, posts on social media or location-based information. The generated information tends to be complex, heterogeneous (texts, images, videos, etc.) and is growing at an incredible pace, with much of this data having a strong spatial and temporal focus. This steady increase in the availability of such a volume of information, forces the development of more effective user interfaces that would assist users in efficient visualization, analysis and exploration of the data. This half-day workshop on User Interfaces for Spatial and Temporal Data Analysis (UISTDA) held in conjunction with the IUI2018 conference on March 11th, aimed at sharing the latest progress and developments, current challenges and potential applications for exploiting large amounts of spatial and temporal data. In this paper we provide an overview of the workshop goals together with its main contributions.

Author Keywords

User Interface; Spatial; Temporal; Data Analysis.

INTRODUCTION

Nowadays, humanity generates many large and complex datasets with strong spatial and temporal characteristics. Social media services like Twitter, are an obvious example of these datasets offering access to an incredible amount of information issued in a given location at a particular time period. To analyze and identify this information and to extract meaningful and unknown spatial and temporal patterns is not an easy task. In general, the generated digital data tends to be complex, heterogeneous (including texts, images, videos, geographic information, temporal information, etc.) and large enough to be handle with common techniques. Hence, special and dedicated solutions to data visualization, analysis and processing need to be proposed. In particular, (1) novel user interfaces that would assist users in analyzing data from the temporal and spatial viewpoints; (2) effective data preprocessing and management techniques for constructing large scale real-world applications or for investigating complex interaction patterns in order to detect useful knowledge; and (3) collaborative systems/platforms for creating or managing large amounts of data having spatial and temporal character (e.g., volunteered geographic systems) are needed to help multiple users effectively collaborate.

The UISTDA2018 workshop[1] held in conjunction with the IUI2018 conference[2], appears in this context to share latest progress, developments, current challenges and potential applications for exploiting large amounts of spatial and temporal data. In this paper, we introduce the topics discussed in the workshop and offer a brief overview of the papers presented therein.

The main topics of the UISTDA2018 workshop are that of supporting user interface research through the practical application of Computer Science theories or technologies for analyzing and making use of various kinds of spatial and temporal data, visualizing spatial and temporal data patterns and providing efficient access to the large wealth of spatial and temporal knowledge, especially from social media, multimedia, human behavior logs, trajectories, etc.

In particular papers concerning the following topics (but not limited to) were discussed in more detailed during the workshop:

- Natural language processing for spatial-temporal data
- Spatial-temporal human behavior analysis
- User interface for spatial-temporal data analysis

[1] http://sociocom.jp/~event/uistda2018/
[2] http://iui.acm.org/2018/

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- Discovering spatial-temporal patterns and knowledge
- Applications with spatial-temporal data
- Evaluation metrics for user interface or applications

WORKSHOP PROGRAM COMMITTEE

The Program Committee of the UISTDA workshop consists of the following researchers:

Omar Alonso (Microsoft, USA)

Yutaka Arakawa (Nara Institute of Science and Technology, Japan)

Eiji Aramaki (Nara Institute of Science and Technology, Japan)

António Branco (University of Lisbon, Portugal)

Christophe Claramunt (Naval Academy Research Institute, France)

João Cordeiro (University of Beira Interior, Portugal)

Michael Färber (University of Freiburg, Germany)

Dhruv Gupta (Max Planck Institute for Informatics, Germany)

Péter Jeszenszky (University of Zurich, Switzerland)

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Yihong Zhang (Kyoto University, Japan)

CONTRIBUTIONS

Keynote Talk

We were pleased to have a keynote talk by Prof. Takuro Yonezawa from Keio University, Japan on the topic of "smart city and smart society". The title and summary of his talk is as follows.

Title: Unfold the city: excavation and analysis of latent spatial-temporal urban data

Summary: Smart city, though there exist several definitions for it, is defined as a complex ecosystem characterized by the intensive use of information and communication technologies, aiming at making the cities more efficiency, more attractive, more sustainable and a unique place for innovation and entrepreneurship. One promising way toward making city smarter is to understand city deeply and real-time based on large amount of heterogeneous city data. However, excepting several social network service data or some advanced cities filled with IoTs, acquiring valuable spatial-temporal city data is still the first obstacle to solve for most of the cities. In this talk, I will present our approach of how we leverage existing city resources which exist in any cities to excavate latent city data, and how we share and analyze the data for understand the city, with over-three years experiments in Fujisawa city, Japan. Furthermore, I will discuss further challenges and many opportunities that smart city, and smart society faces.

Research Paper

A peer-reviewed process was carried out to select the papers, with at least three members of the Program Committee reviewing each paper. This resulted in 5 accepted submissions (initially 7 were accepted out of 9, but 2 have been withdrawn): 2 full papers and 3 short papers, that discuss ideas and progress on several interesting topics, including urban computing, road/city feature extraction, location de-identification, human behavior and video scene retrieval.

Mozaffari *et al.* [1] present methods for classifying reading behavior using data gathered from eye tracker equipments. The classification is done using deep neural networks, specifically, bi-directional LSTMs. In order to alleviate the lack of data the authors further propose how to generate synthetic data by training a hierarchical hidden markov model on the ground truth data.

Graells-Garrido *et al.* [3] develop an aggregation-based approach for the analysis of phone-based trips recorded at the city level. Particularly, they introduce Mobilicities, which automatically generate travel patterns inferred from mobile phone network data using NMF, a matrix factorization model.

Probst *et al.* [4] propose a sketch-based spatio-temporal retrieval system for sports. They suggest data schema for spatio-temporal retrieval and show the web-based user interface. The effectiveness of the proposed user interface was evaluated through the user study using football and Ice hockey games.

Endo *et al.* [2] propose an interpolation method to suggest sightseeing spots by aggregating geo-location information for a given target location with the help of surrounding location

bearing tweets. They show results obtained from information interpolation and analysis of cherry blossoms in Japan in 2017.

Taguchi *et al.* [5] propose an innovative method for location de-identification in Twitter messages, based on the use of a text classification method capable of automatically assigning tweets to the corresponding locations. They use text classification methods for inferring if the location behind a tweet can easily be inferred by an automated method and/or by a human expert, and they also advanced a procedure for de-identifying tweets based on removing morphemes until a location classifier can no longer estimate the location of the tweet.

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