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Special Issue on Deep Learning for Spatio-Temporal Data

Guest Editors:

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In the “big data” era, with the fast development of various positioning techniques such as Global Position System (GPS), mobile devices and remote sensing, spatio-temporal data has become increasingly available. Mining valuable patterns and knowledge from spatio-temporal data is critically important to promote real-world applications of human mobility understanding, smart transportation, urban planning, public safety, health care, environmental management, etc. As the number, volume and resolution of spatio-temporal data increase rapidly, traditional data mining methods, especially the statistics and model-based approaches for dealing with such data, are becoming overwhelmed.

Recently, with the advances of deep learning techniques, deep learning models such as Convolutional Neural Network (CNN), Recurrent Neural Network (RNN) and Graph Neural Network (GNN) have enjoyed considerable success in various machine learning tasks because of their powerful learning ability. They have been broadly applied in many areas including computer vision, natural language processing, graph data mining, and time series data prediction, which inspires many recent works to adopt deep learning models for various spatio-temporal data mining tasks including crowd flow prediction, crime prediction, traffic congestion prediction, weather prediction, neuroscience and various location-based social network services.

This special issue aims to provide a forum for researchers and practitioners in academia and industry to present their latest research findings and engineering experiences in developing and applying deep learning techniques for spatio-temporal data mining tasks and applications.

Topics

Papers are invited in theory, modeling, algorithms, and applications of applying deep learning for various spatio-temporal data mining tasks to establish the latest efforts of the research in this area. Topics of interest include, but not limited to:

- Spatio-temporal data reduction and pre-processing with deep learning
- Heterogeneous spatio-temporal data fusion with deep learning
- Deep spatio-temporal data representation learning
- Trajectory data mining with deep learning
- Anomaly detection in spatio-temporal data with deep learning
- Deep learning based urban traffic prediction models
- Spatio-temporal crowdsourcing with deep learning
- Interpretable deep learning models for spatio-temporal data mining
- Novel deep learning models for mining noisy and sparse spatio-temporal data
- Deep learning models for novel applications based on spatio-temporal data
- Deep learning based spatio-temporal data mining for smart city
- Deep learning for spatio-temporal control and optimization
- Spatio-temporal data management with deep learning
- Spatio-temporal privacy and security with deep learning
- Spatio-temporal knowledge guided deep learning
- Spatio-temporal reasoning, uncertainty, and causality with deep learning

Important Dates

Submissions Deadline: October 30, 2020

First-round review decisions: December 31, 2020

Deadline for revision submissions: January 31, 2021

Notification of final decisions: March 31, 2021

Deadline for Source files: April 20, 2021

Tentative Publication: Late 2021

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