

## Special Issue on Non-IID Outlier Detection in Complex Contexts

### Guest Editors

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### Abstract

Outlier detection (also known as anomaly detection) aims at identifying data objects which are rare or significantly different from the majority of objects. Due to the significance to many critical domains like cybersecurity, fintech, healthcare, public security and AI safety, outlier detection has been one of the most active research areas in various communities, such as machine learning, data mining, computer vision and statistics. Traditional outlier detection techniques generally assume that data is Independent and Identically Distributed (IID), which are significantly challenged in complex contexts where data is actually non-IID. These contexts are ubiquitous in not only graph data, sequence data, spatial data and time series data but also traditional multidimensional, textual and image data. This demands advanced outlier detection approaches to well address those explicit or implicit non-IID data characteristics. This Special Issue on Non-IID Outlier Detection in Complex Contexts will solicit the latest advancements in outlier detection that consider the data interactions, relations, and heterogeneity to enable a more effective identification of the outliers and to provide more reliable outlier detection systems in the aforementioned critical domains.

### Scope of Interest

This special issue solicits original and high-quality research on but not limited to the following topics.

- \* Outlier discovery on explicit non-IID data
  - Graph data
  - Spatial-temporal data
  - Sequence data
  - Time series data
  - Video data
  - Mixed numeric-categorical data
- \* Outlier discovery on implicit non-IID data
  - Multidimensional numeric data
  - Multidimensional categorical data
  - Text data
  - Image data
- \* Outlier models that break the IID assumption
  - Un/weakly/semi/fully-supervised models
  - Graph mining models
  - Online learning models
  - Ensemble models
  - Bayesian networks
  - Deep learning models
- Reinforcement learning models
- \* Non-IID outlier discovery theories/foundation
  - Mathematical formalization
  - Optimization
  - Generalization bounds and learnability
  - Outlier explanation
- \* Applications of non-IID outlier detection
  - Fraud and risk analysis in finance
  - Disease detection in healthcare
  - Intrusion detection in cybersecurity
  - Malicious activity detection in social networks
  - Event detection in video surveillance
  - Safety analysis in AI systems
- \* Related areas addressing similar issues
  - Novelty detection
  - Out-of-distribution example detection
  - Anti-spoofing techniques
  - Adversarial learning

### Submission and Timeline

All submissions must comply with the Submission Guidelines of IEEE Intelligent Systems and will be reviewed by research peers. The schedules are as follows:

- Paper Submission: November 01, 2019
- First Decision: February 01, 2019
- Revision: March 15, 2020
- Final Decision: June 15, 2020
- Camera-ready: July 15, 2020
- Publication: September 2020

### Inquiries

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