Introduction to the Special Issue on Retrieving and Learning from Internet of Things Data

The Internet of Things (IoT) is renovating the way we monitor, understand, and control the physical world. While there are many successful stories on deploying IoT systems in various business sectors, we might underestimate the long-term challenge when facing the explosive amount of IoT and machine-to-machine (M2M) data. Almost all fields of data science need new IoT-aware solutions, including but not limited to data acquisition, cleaning, transformation, storage, integration, indexing, modeling, analysis, visualization, and interpretation.

This special issue aims to serve as a rally point for researchers from a variety of relevant fields of IoT to identify problems in adopting existing data science techniques for IoT/M2M data, and to renovate on them, with an emphasis on the retrieval and learning from these data. This special issue received 14 high-quality submissions, and only 4 of them were accepted. As a result, the acceptance ratio is 28.6%. The topics of the accepted articles are briefly introduced below.

The article titled “[coSense: The Collaborative Sensing Middleware for the Internet-of-Things](#)” presents a collaborative, fault-tolerant, and adaptive sensing middleware for the IoT. The platform manages to harness the large population of IoT devices to provide easy data acquisition with quality-of-service-based data cleaning by combining unsupervised learning and information fusion.

In the article titled “[Interval-based Queries over Lossy IoT Event Streams](#),” the authors propose a novel simplex-based algorithm for probabilistic evaluation of streaming event in an IoT stream. The authors adopt the notion of order statistics and segmented intervals for probability computation of events in a time point or interval.

The article titled “[HandiText: Handwriting Recognition Based on Dynamic Characteristics with Incremental LSTM](#)” proposes a handwriting recognition authentication scheme based on behavior and biometrics features. It captures a person’s static biological features and dynamic behavior features during the writing process (writing speed, pressure, etc.), which are related to habits and difficult for attackers to imitate.

The article titled “[Towards Translating Raw Indoor Positioning Data into Mobility Semantics](#)” studies the problem of translating raw indoor positioning data into mobility semantics that describe a moving object’s mobility event with timestamp and location. The authors propose a three-layer framework that abstracts a variety of semantic levels, namely, data cleaning, annotation, and complementing layers.

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