Introduction to the Minitrack on Smart Application Development and Data Streaming: IoT, I4.0, Smart Cities and More

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Abstract

The Covid-19 pandemic has majorly influenced the research around smart city applications and data management. One big topic for Smart City Applications are the novel traffic patterns. Traffic is going back to values near pre-pandemic and adding further traffic via delivery services that arose during the pandemic and are here to stay. Fast data solutions, efficient software frameworks and sensors as well as novel concepts such as semantic advancements are needed to address such challenges. The minitrack presents semantic complex event processing for processing sensor data. The panel addresses current trends evolving from new traffic patterns in cities and rural areas as well as trends in data streaming.

Keywords: Smart city applications, software frameworks, IoT, data streaming

1. Introduction

Research in smart city applications was majorly influenced by the Covid-19 pandemic and continues to be influenced by novel patterns of behavior and the need for more efficient and stream-lined data management, especially when it comes to real-time data.

With commute traffic in cities going back to nearly pre-pandemic times, for example, new challenges arise since delivery services add on to the traffic because of increased food and package deliveries. Quite some cities such as Chicago have set up pilot projects for food robot deliveries. These small vehicles are in competition with more traffic than a year ago. Smart applications in IoT have seen in 2023 especially these five trends:

- Smart home devices have majorly taken up and new models are available from smart security systems to entertainment devices
- Cybersecurity has been a priority
- Edge computing has risen next to cloud computing
- High relevance of AI and Big Data
- Wearable devices are more complex

Data streaming has seen similar trends in AI and cybersecurity. Additionally, industry interest goes beyond the usual suspects and new trends include the separation of data storage and compute. Data management and governance become key concerns and data science creates schemaless solutions.[1]

These topics will further influence how smart applications and data streaming will evolve in the next couple of years. The following topics are in the scope of the minitrack:

- System Architectures for Smart Application and Industry 4.0
- Best practices and Key Success Factors in Smart Application Development
- Platforms for Smart Applications
- Smart Applications for Smarter Government
- Data-hubs and their roles in Smart Application Developments
- Easy-to-use end-to-end solutions for Smart Applications
- Web services for Smart Applications

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[1] https://www.upsolver.com/blog/top-7-trends-in-streaming-data

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- Real-time data analytics and machine learning in practice
- Successful Smart Application Project Management
- Infrastructures for Smart Applications
- Securing Smart Applications and Sensor Networks
- Promoting Smart Applications
- Digital Twin technology for Smart Cities.

2. Presentation and Panel in the Minitrack

The minitrack received three submissions and we accepted the paper "Knowledge Core: An SCEP Architecture for Smart Installations with Organization-Defined Policies" for publication in the proceedings and presentation at HICSS-57. The authors address the increase in smart applications and ubiquitous IoT computing by analyzing available approaches to process sensor data and sensor events. They present sensor measurements in relation to events, such as entry and occupancy, to support smart application developers with meaningful information. They aim at evaluating events in the context of organization-defined policies via Semantic Complex Event Processing (SCEP). They have extended the traditional SCEP architecture to a constellation of smart installations with organizational policies to the Knowledge Core SCEP architecture. The goal is to provide smart application developers and maintainers with a novel features for processing the data generated by their smart application.

The panel will discuss novel trends in smart city research and data streaming. With the change of traffic patterns, increased efficiency and added logic of data streaming and sensor data processing becomes increasingly important.

3. Conclusion

The presentation represents the increased need for semantic processing in software architectures for smart applications. The panel discussion will give insights how to address the fast-changing requirements for smart cities and data streaming. We are looking forward to lively discussions at HICSS-57 with the authors and audience. We plan to continue this minitrack in the future and invite authors on topics around software and success stories for smart applications and data streaming.