Introduction to the Smart (City) Application Development Minitrack

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Abstract

In the context of this mini-track Smart (City) Application Development, we are interested in how the concepts and ideas of Smart Applications are realized, especially from a software engineering point of view. Topics for manuscripts include planned, currently developed, and/or already finished Smart Application, IoT and Industry 4.0 projects, feasibility studies of all domains, and evaluations of such applications in the real world. One goal of the minitrack is to see which architectures, frameworks, platforms and infrastructures seem to be particularly successful.

1. Introduction

The user community for smart applications is characterized by different stakeholders: from researchers to policy makers to the general public. Thus, it is crucial to achieve easy-to-use end-to-end solutions, which support the diverse roles in these communities and their different interests and knowledge about smart applications. Such concepts are considered in so-called science gateways (also known as virtual laboratories or virtual research environments), which by definition serve communities with end-to-end solutions tailored specifically to their needs.

Software challenges for smart applications are broad, not only in regard to the breadth of the community, but also to the breadth of topics. A specific focus of this minitrack is on how to deal with the details of scenarios like handling huge data sets, high usage loads, complex event processing on real-time data streams, sharing data between applications, security and so forth.

Topics include but are not limited to:

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

2. Content of the Minitrack

This year we accepted one paper out of four. The paper proposes a Time-Sensitive IoT Data Analysis (TIDA) framework that meets the time-bound requirements of time-sensitive IoT applications. The proposed framework includes a novel task sizing and dynamic distribution technique that performs the following: 1) measures the computing and network resources required by the data analysis tasks of a time-sensitive IoT application when executed on available IoT devices, edge computers and cloud, and 2) distributes the data analysis tasks in a way that it meets the time-bound requirement of the IoT application. The TIDA framework includes a TIDA platform that implements the above techniques using Microsoft's Orleans framework. The paper also presents an experimental evaluation that validates the TIDA framework's ability to meet the time-bound requirements of IoT applications in the smart cities domain. Evaluation results show that

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TIDA outperforms traditional cloud-based IoT data processing approaches in meeting IoT application time-bounds and reduces the total IoT data analysis execution time by 46.96%.

4. Conclusion

The accepted paper presents a timely and interesting application in the smart city application domain. It focuses on presenting a framework for solving time-bound challenges while elucidating further features and options. We hope you join us for a panel discussion at the conference about the effect of COVID-19 on the research area, current and future challenges and gaps in the framework landscape.