Event Analytics for Smart City

Supervisor

A/Prof. Dong Jin Song, Jin Song Dong <dongjs1@gmail.com>

Co-supervisor(s)

Prof. Mounir Mokhtari, Mounir.Mokhtari@mines-telecom.fr

Image & Pervasive Access Lab
1 Fusionopolis Way
#21-01 Connexis, South Tower
Singapore 138632

Tel. (65) 6408 2542
Director. (65) 6408 2536
Fax. (65) 6776 1378

secretariat@ipal.cnrs.fr
www.ipal.cnrs.fr

Presentation of the Ph.D. topic

Large complex systems that generate intricate patterns of streaming events appear in many domains. These event streams arise from composite system states and control flows across many interacting components. Concurrency, asynchrony, uncertain environments, probabilistic behaviors and real-time coordination are key features of such systems. Many of the functionalities are realized in these systems by embedded software (and hardware) that must interact with the physical agents and processes. The proper functioning of such systems depends crucially on whether the software-mediated event patterns that are generated fulfil the required criteria. For example in public transport system such as the MRT in Singapore the control software must ensure that the distances between two trains sharing a track never falls below a certain threshold and at the same time must optimize the number of trains deployed on track and their speeds to cater for increased demand for service during peak hours.In such settings it is important to develop modelling and analysis techniques that can compute and predict reliability distribution (the correctness and reliability of interactions) among
the different system components.

In this context, Big Data analytics has given an unprecedented opportunity to use the data associated and generated by the system for deeper insights and better decision making. The key challenge we wish to address however is to identify and extract the relevant event streams from massive data, using which one can make efficient and sound decision with assurance. We note that while "data" is typically static, events are dynamic involving causality, communication, timing and probability. Consequently our goal is to develop an event analytics (EA) framework that will aid the reliable design and control of such systems. We believe that event analytics (EA) driven technologies can offer significant advantages that are complementary and orthogonal to those based on data analytics, which have been and are being widely studied. The proposed framework will consist of modelling and analysis techniques supported by an integrated suite of new analytic tools. We shall also demonstrate the scalability and applicability of our methods in the domain of cyber physical systems i.e., smart city.

Expected deliverables

The objective of this project is to investigate and develop the integrated analytic systems that may combine model checking, machine learning, and other OR based decision support systems.

Keywords

Events analytics, Formal Methods, Verification, Smart Cities,

Applicant profile

- Master Degree or Engineer Student (last year of studies)

- Skills in programming, JavaScript and server-side application…

- Strong motivation towards this challenging project.

- Open to work with both French and Singaporean scientists.

- Availability for starting second semester of 2015.

Gratification: Compliant to French Regulation on Ph.D. students (Contract doctoral)

Image & Pervasive Access Lab
1 Fusionopolis Way
#21-01 Connexis, South Tower
Singapore 138632

Tel. (65) 6408 2542
Director. (65) 6408 2536
Fax. (65) 6776 1378

secretariat@ipal.cnrs.fr
www.ipal.cnrs.fr