IEEE AINA 2016 Keynote Talk I

Prof. Vincenzo Loia, University of Salerno, Italy

A Computational Perspective to Situational Awareness

Abstract

The Situation Awareness (SA) concerns all things happening around us and is typically associated to what is critical with respect to our interest. For instance, an airplane pilot does not need to be aware of everything around him but only the information required for driving correctly and safely. Endsley provided a more formal definition that considers Situation Awareness as a three-phase process: perception of the elements of an environment in a given time interval, comprehension of the aforementioned elements and projection of their states into the next future. More in details, from a computational viewpoint, SA aims at formalizing and deducing situations (occurring in the real world) by processing, fusing and abstracting context information.

We proposed the Perception-Oriented Approach to identify situations. Such approach is based on two phases: low-level perception and high-level perception. The low-level perception is realized by means of Semantic Technologies and can generate more abstract information from raw sensor data by also considering knowledge about the environment. Sensor Middleware like Global Sensor Network (GSN), Linked Sensor Middleware (LSM), OpenIoT and Semantic Web Ontologies like W3C SSNO have been employed to support gathering and processing of sensor data. At this level, we proposed approaches to assess the reliability, and other quality dimensions, of sensor data (observations). In particular, we introduced an approach to exploit a fuzzy-based consensus model to handle cases in which redundant sensors provide discordant observations.

Moreover, high-level perception is realized by means of techniques like, for instance, Fuzzy Formal Concept Analysis, Fuzzy Cognitive Maps, etc. and can organize and classify abstract and actionable information to support the work of DSSs. At this level, we proposed a nature-inspired approaches, based on Artificial Bees, for mining association rules used to foster the resilience of the situation identification algorithms and the adoption of Semantic Web technologies, like SAW Ontology, to model situations and Semantic Inference Engine (OWL-based and Rule-based) to reason on them.
IEEE AINA 2016 Keynote Talk II

Dr. Martin Brynskov
Aarhus University, Denmark

Open and Agile Smart Cities

Abstract

Cities across the globe are looking for ways to spur open innovation. The reason is simple. Innovation is needed to overcome the digital transition of cities and communities, and it has to be open for two reasons: First, it must be open to include a variety of stakeholders, because services are increasingly connected to other systems and co-created with stakeholders outside the old verticals, and second, it must help to establish a competitive but attractive enough market for developers, thereby driving down cost, increasing quality and avoiding vendor lock-in and monopolization. Seen from a developer’s perspective, one city is not a market. A number of countries or a continent is a sizable market. But global de facto standards for portability and interoperability are the only way to create a true global market for smart city services. In such a market, developers can start investing and specializing with an outlook of sustainable business models in public-private innovation partnerships.
IEEE AINA 2016 Keynote Talk III

Mr. Arijit Ukil, Innovation Labs, Tata Consultancy Services, India

IoT Healthcare Analytics: The Importance of Anomaly Detection

Abstract

Healthcare data is quite rich and often contains human survival related information. Analyzing healthcare data is of prime importance particularly considering the immense potential of saving human life and improving quality of life. Furthermore, IoT revolution has redefined modern health care. IoT offers its greatest promise to deliver excellent progress in healthcare domain. In this talk, proactive healthcare analytics specifically for cardiac disease prevention will be discussed. Anomaly detection plays a prominent role in healthcare analytics. In fact, the anomalous events are to be accurately detected with low false negative alarms often under high noise (low SNR) condition. An exemplary case of smartphone based cardiac anomaly detection will be presented.