GUEST EDITORIAL
Special Issue on Advancing Standards for Smart Transducer Interfaces

NOWADAYS transducers (sensors and actuators), as defined by ISO/IEC/IEEE 21451 Standards, are employed in various application fields: industrial, biomedical, environmental, energy, and transportation, etc. The literature highlights the presence of several contributions of research activity. Meanwhile, the international community has shown growing interest in smart sensors.

Smart sensor is a current term used to single out a device capable of acquiring and processing data, as well as performing auto-learning. It is the basis for homecare or telemedicine applications, process automation, intelligent transportation systems and environmental monitoring.

The ISO/IEC/IEEE 21451-x Standards (previously known as IEEE 1451.x) is a family of smart transducer interface Standards, which allows users and designers to design smart sensor networks and applications using different protocols, such as XMPP, TCP/IP, HTTP, and Web services to perform communications among sensors and/or actuators. Applications can access Transducer Electronic Data Sheets (TEDS) for sensor identification and system configuration. One of the standards on signal treatments can be performed to enable better interactions between smart sensors and actuators. Another standard enables the communications between applications and sensor integrated with Radio Frequency IDentification (RFID)-based systems. Thus the ISO/IEC/IEEE 21451-x is a growing family of standards responsible for the development of Smart Sensors. It involves developing technology for a seamless connection between smart sensors and networks. In order to meet industry's needs, new members of the family of standards are being developed, and meanwhile some of the standards are under revision. Currently Working Groups are convened to revise the 21451-1, 21451-2 and 21451-4 Standards, while other Working Groups are developing the new 21451-1-4 and 21451-001 Standards. The current Family of Standards ISO/IEC/IEEE 21451-x includes:

• ISO/IEC/IEEE 21450, Information technology — Smart transducer interface for sensors and actuators — Common functions, communication protocols, and Transducer Electronic Data Sheet (TEDS) formats;
• ISO/IEC/IEEE 21451-001, Information technology — Smart transducer interface for sensors and actuators — Part 001: Recommended practice for signal treatment applied to smart transducers;
• ISO/IEC/IEEE 21451-1, Information technology — Smart transducer interface for sensors and actuators — Part 1: Common network services;
• ISO/IEC/IEEE 21451-1-1, Information technology — Smart transducer interface for sensors and actuators — Part 1-1: Network interface – TCP/UDP services, being planned;
• ISO/IEC/IEEE 21451-1-2, Information technology — Smart transducer interface for sensors and actuators — Part 1-2: Network interface – HTTP services, being planned;
• ISO/IEC/IEEE 21451-1-3, Information technology — Smart transducer interface for sensors and actuators — Part 1-3: Network interface – Web services, being planned;
• ISO/IEC/IEEE 21451-1-4, Information technology — Smart transducer interface for sensors, actuators, and devices — Part 1-4: eXtensible Messaging and Presence Protocol (XMPP) for network device communications;
• ISO/IEC/IEEE 21451-1-5, Information technology — Smart transducer interface for sensors and actuators — Part 1-5: Network interface – SNMP services, being planned;
• ISO/IEC/IEEE 21451-2, Information technology — Smart transducer interface for sensors and actuators — Part 2: Serial point-to-point interface;
• ISO/IEC/IEEE 21451-4, Information technology — Smart transducer interface for sensors and actuators — Part 4: Mixed-mode communication protocols and Transducer Electronic Data Sheet (TEDS) formats;
• ISO/IEC/IEEE 21451-5, Information technology — Smart transducer interface for sensors and actuators — Part 5: Wireless communication protocols and Transducer Electronic Data Sheet (TEDS) formats;
• ISO/IEC/IEEE 21451-7, Information technology — Smart transducer interface for sensors and actuators — Part 7: Transducers to Radio Frequency Identification (RFID) systems communication protocols and Transducer Electronic Data Sheet formats (TEDS) formats.

The scope of this Special Issue is to present and highlight the advances and the latest novel and emergent technologies, implementations and applications in the field of Smart Transducers and Sensors according to the Guidelines of the family of Standards. Therefore, it provides an overview of the current Standards features and the related state of the art to the readers. The final aim of the Special Issue is to stimulate the international scientific community and industry to suggest new features and ideas addressing the design and development of Smart Transducers and Sensors.

The Special Issue has collected papers concerning applications of the Standards family, revision proposals and suggestions. All accepted papers have provided interesting and promising advances of the state of the art. In some cases even complementary aspects have been suggested to the Working Groups managing the Standards review. Most of the manuscripts come from Europe and some of them from Asia and America. This Special Issue has even allowed us to highlight the weaknesses and difficulty of industry in putting in practice the Standards family guidelines.

Finally, we would like to thank all authors for their contributions and reviewers for their efforts to guarantee manuscripts of high quality. We thank the Editor-in-Chief, Prof. Krikor Ozanyan for his guide during the entire process, Alison Larkin and the Sensors Journal Staff for their support, efficiency and competence.
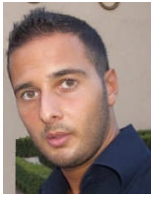
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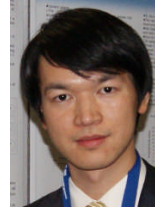
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