IoT-Based Wireless Sensor Network Systems: Softwarization and Dynamic Network Re-orchestration

Abstract: The progression made in the fields of Internet of Things (IoT) and Wireless Sensor Networks (WSN) are leading into the more comprehensive and integrated organization of the Cyber Physical Intelligence. Both the Cloud and Fog (or Edge) computing plays important role in extending the capability of wireless sensor networks. This, in effect, enables the virtualization and support the intelligence around the various services to back up what the physical wireless sensor network could offer. Ultimately the goal of transparent coordination between the virtual and physical organizations could be achieved through the two ways communication between the cloud and the WSN using the Internet (or IoT) connectivity. Furthermore, this could benefit from the Industry4 model that separate the IT layer from the OT layer. Timing and synchronization among the system components are of vital importance in coordinating the controlled actions of the events of a highly complex and distributed system. While this type of dynamic and adaptive operation could significantly enhance the performance, any subsequentially disruption of services as a result of dynamic network re-orchestration should be minimized if not eliminated. The field is directly associated with wide range of applications such as transportation, farming, horticulture, health, manufacturing, to name few. The talk will discuss the generic conceptual architecture for IoT based WSN system with emphasis on the degree of freedom offered by softwarization, edge computing and network functions virtualization. The talk also discusses examples on conceptual used-cases relevant to shared spaces, precision health and vehicular networks.

Bio: Adnan Al-Anbuky http://sense.aut.ac.nz/SeNSe_Lab/adnan.php is a full professor at AUT-New Zealand and director of SeNSe research laboratory http://sense.aut.ac.nz/SeNSe_Lab/. His current research area is around the dynamic interaction of wireless sensor network (WSN) with the physical phenomenon in capturing the critical events taking into consideration the Internet of things (IoT) and cloud support. Adnan has assumed various academic and administrative roles at Auckland University of technology, Canterbury University, Yarmouk University and Baghdad University of Technology. He also spent significant time with Industry for taking the research outcome into commercialization. The latter is manifested through his work with Swichtec NZ, Plant and Food, SCION and others. Recently, he has been involved in projects like public space ambient intelligence PSAmI, Precision health & remote monitoring of human movements, remote traceability of food condition at inventory, and vehicular dynamic clustering. These have encouraged the contribution towards the concepts of IoT base WSN, software-defined infrastructure, and cyber-physical intelligence. Adnan is a member of the editorial board of number of international journals and scientific groups. He is actively contributing to the organization and operation of numerous local and international events and conferences. He has delivered number of keynote talks and has numerous conference and journal peer reviewed publications.