Toward Internet of Everything: The Role of Ontologies

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Abstract:

We are witnessing a new revolution in computing and communication. The Internet, which has spanned several networks in a wide variety of domains, is having a significant impact on every aspect of our lives. These networks are currently being extended to have significant sensing capabilities, with the evolution of the *Internet of Things (IoT)*. With additional control we are entering the era of *Cyber-physical Systems (CPS).* In the near future the networks will go beyond physically linked computers to include multimodal-information from biological, cognitive, semantic, and social networks. This paradigm shift will involve symbiotic networks of people (social networks), smart devices, and smart phones or mobile personal computing and communication devices that will form *smart net-centric systems and societies (SNSS)*. These devices – and the network -- will be constantly sensing, monitoring, interpreting, and controlling the environment. A key technical challenge for realizing the "Internet of Everything (IoE)" is that the network consists of things (both devices and humans) which are heterogeneous, yet need to be interoperable. In other words devices and people need to interoperate in a seamless manner. This requires the development of standard terminologies (or ontologies) which capture the meaning and relations of objects and events. Creating and testing such terminologies will aid in effective recognition and reaction in a network-centric situation awareness environment. In this talk, I will provide a unified framework for Internet of Things, Cyber-Physical Systems, and Smart Networked Systems and Societies. I will also describe various activities at the National Institute of Standards and Technology in each of these areas. Then, I will discuss the role of ontologies in realizing the IoE vision.

About the speaker:

 Ram D. Sriram is currently the chief of the Software and Systems Division, Information Technology Laboratory, at the National Institute of Standards and Technology. Before joining the Software and Systems Division, Sriram was the leader of the Design and Process group in the Manufacturing Systems Integration Division, Manufacturing Engineering Laboratory, where he conducted research on standards for interoperability of computer-aided design systems. Prior to joining NIST, he was on the engineering faculty (1986-1994) at the Massachusetts Institute of Technology (MIT) and was instrumental in setting up the Intelligent Engineering Systems Laboratory. Sriram has co-authored or authored more than 250 publications, including several books.   Sriram was a founding co-editor of the

International Journal for AI in Engineering. Sriram received several awards including: an NSF's Presidential Young Investigator Award (1989); ASME Design Automation Award (2011); ASME CIE Distinguished Service Award (2014), and the Washington Academy of Sciences' Distinguished Career in Engineering Sciences Award (2015). Sriram is a Fellow of ASME, AAAS and Washington Academy of Sciences, a member (life) of ACM, a Senior Member of the IEEE, and a member (life) of AAAI. Sriram has a B.Tech. from IIT, Madras, India, and an M.S. and a Ph.D. from Carnegie Mellon University, Pittsburgh, USA.
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