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Smart Buildings as building blocks of a Smart City

Saifur Rahman, PhD
Joseph Loring Professor of electrical engineering
Virginia Tech Advanced Research Institute
Arlington, Virginia, USA
Email: srahman@vt.edu

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A smart building has a much higher value proposition if it can function in the context of a smart city. It can then contribute more to a community and improve the environment its occupants work in. In order to make urban living more safe, secure and environmentally sustainable, we focus on environment governance, public safety, city planning, industry facilitation, resource utilization, energy conservation, traffic control, telemedicine, homecare, interpersonal communications, social activities and entertainment.

A smart city relies on widely distributed smart devices to monitor the urban environment in real-time, collects information for intelligent decision making, and facilitates various services to improve the quality of urban living. The distributed network of intelligent sensor nodes, as well as data centers/clouds where sensor data are stored and shared, constitutes a smart city infrastructure. Participatory sensing plays an indispensable role in emerging initiatives of a smart city, which retrieves sensor data from groups of people or communities. The proliferation of personal mobile devices and development of online social networks make participatory sensing viable at a large scale but introduce many open problems at the same time. Smart cities address urban challenges such as pollution, energy efficiency, security, parking, traffic, transportation, and others by utilizing advanced technologies in data gathering and communications interconnectivity via the Internet. It provides real time and remote monitoring for different aspects of data management in areas such as transportation, communication, video surveillance, and sensors distributed throughout the city.

Professor Saifur Rahman is the founding director of the Advanced Research Institute (www.ari.vt.edu) at Virginia Tech where he is the Joseph R. Loring professor of electrical and computer engineering. He also directs the Center for Energy and the Global Environment (www.ceage.vt.edu). He is a Life Fellow of the IEEE and an IEEE Millennium Medal winner. He is the president-elect of the IEEE Power and Energy Society (PES) for 2016 and 2017. He was the founding editor-in-chief of the IEEE Electrification Magazine and the IEEE Transactions on Sustainable Energy. In 2006 he served on the IEEE Board of Directors as the vice president for publications. He served as the chair of the US National Science Foundation Advisory Committee for International Science and Engineering from 2010 to 2013. He has conducted several energy efficiency related projects for Duke Energy, Tokyo Electric Power Company, the US Department of Defense (ESTCP Program), the State of Virginia and the US Department of Energy.