

Distinguished Colloquium

Dynamic Deployment of Sensor Network for Boundary Detection of an Event

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Wireless sensors networks (WSNs) provide ubiquitous and distributed sensing of data for a single or multiple phenomenon. The characteristics of a WSN are ideal for use in determining boundary of phenomenon under different scenarios. However, often such boundaries are camouflaged or covered by cloud, fog, heavy forest, or smoke. For example, in wild forest fire application, a cloud of smoke can obscure accuracy of event's boundary, even using satellites. From the strategic point of view, it is important to determine the accurate region of an event after the fact for appropriate on-ground actions. Here, we propose a method for determining an accurate area with minimum number of sensors by modeling in to a bin-filling problem. We solve this by a Markov chain for two specific sensor distributions: uniform and Gaussian. We also propose dynamic strategies for deployment of sensors in detecting an event. This scheme is shown to be useful for emergency situations where constraints are present in terms of time, resources and event location.

Biography:

Dharma P. Agrawal is the founding director for the Center for Distributed and Mobile Computing in the School of Computing Sciences and Informatics, University of Cincinnati, Cincinnati, OH. During autumn 2006 and winter 2007, he was on sabbatical leave as a Visiting Professor of ECE at the Carnegie Mellon University. He has been a faculty member at the N.C. State University, Raleigh and the Wayne State University. His current research interests include resource allocation and security in mesh networks, efficient deployment and security in sensor networks, use of Femto cells, and heterogeneous wireless. At UC, he has led implementation of two different test-beds: one for Sensor Network for monitoring CO around the UC campus and second 26 nodes Wireless Mesh Network in 8th floor of 3 Engineering buildings. He has co-authored a textbook entitled *Introduction to Wireless and Mobile Systems*, third edition, published by Cengage in 2010. His second co-authored book *Ad hoc and Sensor Networks- Theory and Applications*, second edition has been published in 2011 by World Scientific. A co-edited book entitled, *Encyclopedia on Ad Hoc and Ubiquitous Computing*, has been published by the World Scientific and co-authored books entitled *Wireless Sensor Networks: Deployment Alternatives and Analytical Modeling*, and *Innovative Approaches to Spectrum Selection, Sensing, and Sharing in Cognitive Radio Networks* have being published by Lambert Academic. He is an editor for the *Journal of Parallel and Distributed Systems*, founding Editorial Board/Advisory Member, *International Journal on Distributed Sensor Networks*, *International Journal of Ad Hoc and Ubiquitous Computing (IJAHUC)*, *International Journal of Ad Hoc & Sensor Wireless Networks*, and the *Journal of Information Assurance and Security (JIAS)*, and *International Journal of Communications, Network and System Sciences (IJCNS)*. He has served as an editor of the *IEEE Computer magazine*, and the *IEEE Transactions on Computers* and the *International Journal of High Speed Computing*. He has been the Program Chair and General Chair for numerous international conferences and meetings. He has received numerous certificates from the IEEE Computer Society. He was awarded a "Third Millennium Medal," by the IEEE for his outstanding contributions. He has published over 580 papers, delivered keynote speech for 22 international conferences, and given 29 different tutorials and extensive training courses in various in the areas of Ad hoc and Sensor and Mesh Networks, including security issues. He has graduated 59 PhDs and 45 MS students. He has been named as an **ISI Highly Cited Researcher** and has been recently awarded IEEE CS **Harry Goode Award**. He is a **Fellow** of the **IEEE**, the **ACM**, the **AAAS** and the **World Innovation Foundation**.