Computer Science

ALERT: AN ARCHITECTURE FOR THE EMERGENCY RETASKING OF WIRELESS SENSOR NETWORKS. Syed R. Rizvi, Stephan Olariu, & Michele C. Weigle, Dept. of Computer Science, Old Dominion University, Norfolk, VA 23529. When an emergency or disaster strikes, first responders work as part of a complex emergency management network that calls upon many functions, resources, and capabilities. The objective of our research is to design a real-time information system to improve emergency-response functions by bringing together information to respond to a terrorist attack, natural disaster or other small or large-scale emergency. We call this system *ALERT: An Architecture for the Emergency Retasking of Wireless Sensor Networks*. The novel contribution of this research to the emergency response strategies is the seamless integration of various wireless sensor networks by *retasking* them with explicit missions involving a dynamically changing situation. Preliminary results have shown that retasking sensor networks for emergency response is a promising new paradigm that can not only promote a wider adoption of sensor network systems in support of guarding our national infrastructure and public safety, but can also provide invaluable help with disaster management and search-and-rescue operations.

DENSE UNSTRUCTURED AND STRUCTURED MATRIX COMPUTATIONS USING MPI. Stephen V. Providence, Dept. of Computer Science, Hampton University, Hampton, Virginia 23668. Computations with dense unstructured general matrices requires $O(n^3)$ operations and $O(n^2)$ words of storage for $n \times n$ input matrices. Such matrices are encountered in applications to solving integral equations. The best algorithms involving computations with dense structured matrices require $O(n \log^2 n)$ operations and $O(n)$ words of storage with small overhead constants. MPI or the message passing interface binds to the C programming language and is used to implement parallel algorithms. The time and space complexity estimates above are for sequential algorithms involving matrix computations. We have interest in the complexity estimates for parallel implementation of the sequential versions. For p processors where $p << n$, straightforward complexity estimates are proportional to $O(n^3)/p$ operations and $O(n^2)/p$ words for parallel implementation of dense unstructured general matrix computations. Analogously, computations with dense structured matrices require $O(n \log^2 n)/p$ operations and $O(n)/p$ words for parallel implementation. We conduct experiments on a high-performance computing cluster computer system to obtain the hidden constants in the O-notation of the estimates given.

Education

THE IMPROVING GROUNDS EXHIBITION. E. G. Maurakis, R. Conti, and D. Hagan. Science Museum of Virginia. Objectives of the Improving Grounds exhibition project are to create exhibits, programs, audio and video media for mass communication, and web-based curriculum materials on how to improve health and fitness. The overarching theme is a science perspective on understanding, testing, and measuring self-improvement in health and fitness. Exhibits and programming will be