IIA-1427584 (Bein, University of Nevada at Las Vegas)

Power management, energy-efficient computing, and smart control for alternative energy.

Award Abstract

The proposed project catalyzes a new collaboration in the area of green computing between the PI Bein of the University of Nevada, Las Vegas and Dr. Hito Ito of the University of Electro-Communications, Tokyo as well as engineers at Panasonic Japan. The collaboration focuses on applying algorithmic ideas in the area of sustainability. Power management and energy-efficient computing are ever more important, given the exponential growth in the number of information technology devices worldwide. Japan's Green IT Initiative has focused especially on advanced control and management enabled by IT and electronics. Japan has now a lead position in this area. One of the goals of the planning visit is to set a foundation for future collaborative research and mutual technology transfer. An important component of this project is student involvement, with the PI's Ph.D. student participating in the planning visit to enhance professional development and enable fuller participation in follow-up research.

Specific areas for investigations are power-down problems, speed scaling mechanisms and smart algorithms for alternative energy management and storage. Energy conservation and management involves decision making in complex situations and with incomplete information about the future. Thus, it is natural to study such problems in the framework of game theoretic and online competitive models. The proposed new U.S.-Japanese collaboration seeks to tackle a number of difficult problems in the area of online algorithms, with great potential for impact in application areas, and along the way we expect to find general paradigms for online algorithms. It is expected that techniques developed by the proposer such as the knowledge state method, tracklessness, and task system analysis will complement the Japanese host's research in green computing with a focus on consumer electronics applications.