Engineers get $1.9 million for smart grid project

Cornell University

A Cornell research team has received a four-year, $1.9 million grant from the National Science Foundation to develop a system for computation and information sharing when designing a "smart" electrical grid.

The team, led by principal investigator Lang Tong, the Irwin and Joan Jacobs Professor of Engineering, is exploring the computational aspects of how to manage the changing electrical grid, or so-called "smart grid," which is evolving due to a growing need to integrate renewable energy systems.

The team will study a cloud-computing architecture for scalable, consistent and secure operation of smart grids, and novel stochastic optimization techniques for future energy systems. Among their goals is to develop new software tools for cloud platforms.

The electric grid in the United States has evolved over a century from a series of small, independent, community-based systems to one of the largest and most complex cyber-physical systems in the world, according to the project team's proposal. The grid consists of thousands of generators and substations, linked by transmission and distribution networks. But these once-engineering marvels are being challenged by a worldwide effort to mitigate climate change by reducing carbon emissions, the proposal states.

"The fundamental question is, where should computation be done?" Tong said. "Locally, centrally, what are the types of information that need to be shared at different locations, can we make things consistent, and is cloud computing a viable platform for something like the smart grid?"

Cornell collaborators on the project are Bob Thomas, professor emeritus of electrical and computer engineering; Ken Birman, the N. Rama Rao Professor of Computer Science; and Tim Mount, professor of applied economics and management. The team also includes collaborators from the University of California-Berkeley and Georgia State University.

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