

Professors receive \$600,000 from Foundation

BY ROB ANDERSON

Wireless networks of tiny sensors may someday help health-care professionals monitor and assist patients with Alzheimer's disease or provide emergency response teams with valuable information on disasters such as explosions, building collapses or plane crashes.

Two LSU professors are working to hasten the arrival of this technology, and they've received substantial support from the National Science Foundation to aid them in their efforts.

S.S. Iyengar, the Roy Paul Daniels professor and chairman of LSU's Department of Computer Science, and Rajgopal Kannan, an assistant professor in computer science, have received more than half a million dollars in grants from the National Science Foundation for two projects. The first project, for which the NSF has committed \$200,000 during the next three years, involves research into "Survivable Sensor Networks," or finding ways to ensure that tiny sensor networks placed in vehicles, buildings or other locations can survive disasters and successfully transmit the potentially valuable data they have collected. The second project, for which the NSF is providing \$400,000 during the next three years, involves research into the security and movement of data, within sensor networks and through other electronic methods, such as e-mail.

Both projects involve what are called Distributed Sensor Networks, which consist of a set of geographically distributed "intelligent" sensors designed to collect measurements – acoustic, seismic, infrared and so forth – from the environment in which they are placed. The data are then processed by an attached processing element into abstract sensor estimates and transmitted to other locations. According to Iyengar and Kannan, there are an almost endless array of uses for these kinds of networks and a number of technology companies are interested in the possibilities.

For instance, in the case of elderly adults in poor health, wireless motion sensors can be used to monitor activity in the home and assist with daily routines. The sensors could detect that a person had not been into the

kitchen that day and would transmit this to another device which would create a pop-up message on the television screen, reminding he or she to eat or take medication.

"This research offers tremendous possibilities in a variety of fields, from national security to personal safety," said Kevin Smith, vice chancellor for research and graduate studies. "Its possible uses in the health care industry tie in nicely with the efforts of our researchers in the LSU Life Course and Aging Center."

Sensor networks could also be used for environmental purposes, such as monitoring pesticide levels in crop fields. And, of course, the technology could be used in sensitive, national security projects or for emergency response.

Making these sensor networks "survivable" means studying how they might be placed or arranged so that, if some are destroyed, the data they have collected still get out to those who need it. In addition, in most cases, these sensor devices must operate on limited energy supply. Thus, Iyengar and Kannan are examining the possibility of creating a method whereby these devices "sleep" for certain periods while no data are being collected.

In addition to investigating how data from sensors are transmitted safely, the pair is working to find ways to ensure that data are transmitted securely. As part of this effort, Iyengar and Kannan are developing ways to track anonymous e-mails.

Both of these areas are of potential value to those trying to fight terrorists. If, for instance, sensors or sensor networks are used for monitoring enemy combatants, it would be important that the data being transmitted be safe from "outside" monitoring. In addition, if known terrorists are using anonymous e-mails to communicate, a method for tracking the senders could be crucial for tracking them down.

Iyengar and Kannan are being helped on the project by six LSU graduate students and two undergraduate students.

For more information on the NSF grants or LSU's Department of Computer Science, contact Iyengar at 225-578-1495 or siyeng1@lsu.edu.