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LSU Professors Develop Technology to Assist with Efficient Management of Water and Agriculture

(Source: Baton Rouge Today)

Water, food and environment are important facets of the fabric of today's ecosystem. With the increasing population, the need for food and fresh water has been steadily rising. Increased consumption of fresh water and rapidly spreading pollutants are leading to an unhealthy contention between industrial and rural/agricultural sectors for access to limited water resources. In this setting, efficient management of water resources and irrigated agriculture has become an issue of utmost importance.

In developing countries like India, the rate of increase in food production is no longer able to keep pace with that of the population. It is estimated that nearly 60 percent of available land in India is wasteland. A viable solution to such a global problem lies in the use of affordable technology for driving precise agriculture, reclaiming wastelands and increasing yields ushering a new green revolution.

S.S. Iyengar, chair of LSU's Department of Computer Science and the Roy Paul Daniels professor in the LSU Center for Computation and Technology, and Supratik Mukhopadhyay, assistant professor of computer science, along with Samrat Ganguly of Nulogix Labs Inc. and Sangram Ganguly of NASA Ames Research Center and the Bay Area Environmental Research Institute, are jointly developing the Cognitive Information Management, or CIM, shell, a complex event-processing architecture and system that combines an agile machine-learning engine with distributed intelligent agents to provide real time analytics and control for precision agriculture and irrigation management. In collaboration with Morph2o LLC, a water management company, and the Indian Council for Agricultural Research's National Agricultural Innovation Project, or NAIP, the researchers are deploying the technology in arid regions in United States and India for soil and water management, fertigation and wasteland recovery.

The CIM shell combines information from satellite imagery from LANDSAT, a series of Earth-observing satellite missions jointly managed by NASA and the U.S. Geological Survey; macro- and micro-climate information as obtained from weather stations; and sensors and data about moisture, pH, salinity and other related factors from ground sensors and the USDA databases to generate accurate intelligent responses, which can include predictions on crop growth in a particular condition and floods and possible reactive measures.

This technology can also be used to predict and counter outbreaks of crop-threatening diseases by automatically turning on and off irrigation systems, sending alerts and other similar acts. It provides a convergent platform through the use of distributed databases and adaptable middleware that can access and store data from diverse sources, enabling their processing by agents and machine learning engines communicating the reactions to actuators.

For more information about SIM Shell technology, contact Iyengar at (225) 578-1252 or iyengar@csc.lsu.edu.

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