This research has allowed a multidisciplinary team to collaborate and establish a decision support system for precision agriculture. Undergraduate and graduate students have been trained with necessary agriculture and engineering skills to work in agricultural industry.

Establish an Intelligent Equipment Lab for Precision Agriculture at Prairie View A&M University

Who cares and why?

The agricultural industry faces a challenging task of sustaining the growing world population. Through the use of well-timed information gathering and proper decision making, the tasks can be facilitated with modern technology. In the 21st century, precision agriculture equipped with Information Communication Technology (ICT) and Decision Support System (DSS) is adopted in rural areas. ICT enables farmers to collect critical crop information and DSS guides farmers to understand and utilize the information to make informed decision. In order to educate current undergraduate engineering and agriculture students in the necessary ICT and DSS knowledge, a multidisciplinary project team including faculty from STEAM (Science, Technology, Engineering, Agriculture, and Mathematics) at Prairie View A&M University has been assembled to enhance teaching capabilities by providing PVAMU students an intelligent equipment laboratory.

The objectives of this project include: (i) Enhance multidisciplinary teaching/research collaboration and integration; (ii) Improve teaching/research capability in Agriculture Sciences, Technology, Engineering, and Mathematics (STEAM); (iii) Strengthen underrepresented students' working skills on up-to-date agricultural ICT; and, (iv) Establish a fully operational intelligent equipment lab.

What has the project done so far?

The accomplishments can be categorized in three areas:

1) Facility: An intelligent equipment lab is established at Prairie View A&M University Electrical and Computer Engineering department room 223.

2) Project building: A data collection and decision making system was built based on National Instruments (NI) Wireless Sensor Network (WSN) and sensors: humidity, temperature, soil moisture.

3) Student training:

a. Each year, two undergraduate students were hired on this project. They were trained with precision agriculture, Information and Communication Technology (ICT) and Decision Support Systems (DSS) techniques.

b. A senior design group was supervised each year to build a smart irrigation system utilize the knowledge of ICT and DSS;

c. A graduate student has been trained on this project and has finished his thesis defense: "Design and Development of a Decision Support System for Precision Agriculture." He will obtain his master's degree in the Fall Semester 2014.

4) Teaching materials: Teaching materials on precision agriculture, ICT and DSS were developed and demonstrated in the classroom. Student surveys were collected. A basic ICT and DSS system was built based on National Instruments (NI) Wireless Sensor Network (WSN).

Impact Statement

The project has positive impacts on: 1) Developing the wireless sensor network based decision support system and disseminating to the research community; 2) Improving students' learning and career preparation through real world project; 3) Enhancing faculty members' expertise on precision agriculture related research and teaching.
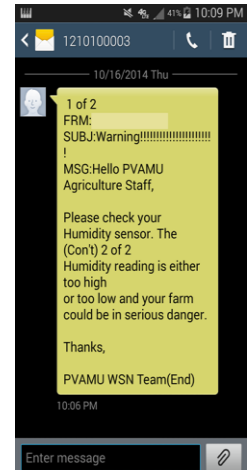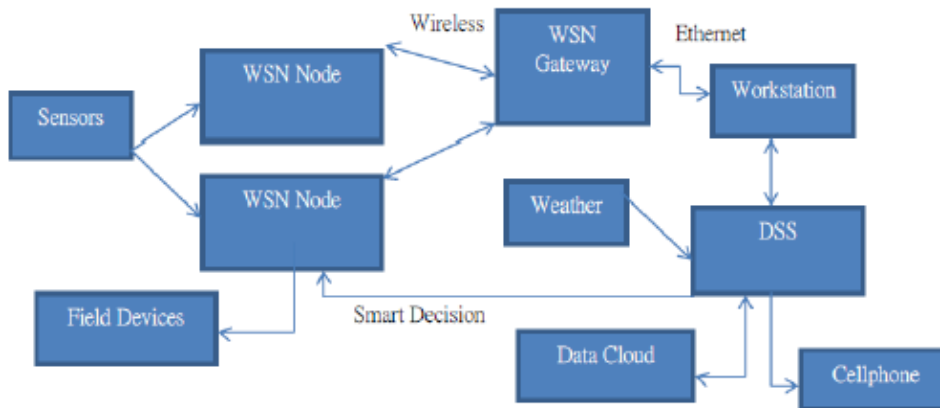
What research is needed?

A database is activated to the DSS system, and the data obtained from sensors are to be stored in a data cloud established by a high performance computing cluster. More sensors are to be developed and added to the system with focus on soil moisture.

Want to know more?

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