WSN as a tool for supporting Agriculture in the Precision Irrigation

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INTRODUCTION

- The agricultural potential of the Brazilian Northeast
- The aid of technology in precision agriculture:
  - Benefits offered for irrigation:
    - Irrigation Process Automation;
    - Levels Control of soil humidity;
    - Optimization use of resources.
They are focused on the physical environment;

They are composed of devices called sensor nodes that capture information from the environment;

These devices are scattered in the environment in order to monitor it;

Communication protocols and different topologies should be used in accordance with the scope.
RELATED WORKS

Simulation Tools

- **J-SIM:**
  - Written in Java;
  - Developed by Ohio University (USA).

- **SENSE:**
  - Written specifically for simulation of sensor networks;
  - Three types of users: network designer, components and high-level users.

- **NetTopo:**
  - A framework designed to test algorithms in WSN;
  - Parameters and variables can be tested by viewing its effects on the environment.

- **TYTHON:**
  - An extension of TOSSIM;
  - Integrates the Python language and a set of instructions to interact with TOSSIM.
RELATED WORKS

Simulation Tools

- TOSSIM:
  - Discrete event simulator;
  - Operates on the TinyOS;
  - The behavior of sensor nodes (motes) can be simulated;
  - Has mechanisms to integrate graphical interfaces facilitating the visualization of the simulation in running.
CASE STUDY
Assisted Irrigation

**Motivation:**
- Irrigation is of great importance for the region;
- Lack of technologies in the handling and interpretation of data.

**Aim:**
- Facilitate the interpretation of data to users of the environment.
- Components native language NesC;
- Interconnected by similars interfaces;
- Main component: IrrigaçãoAssistidaAppC
- Main interface: AMControl.
CASE STUDY
User Interaction

**Figura 2:** Application Interface Graphic Elements

**Figura 3:** Field’s initial situation
**CASE STUDY**

User Interaction

**Figura 4:** Field’s initial situation

**Figura 5:** Field’s situation after the occurrence of a new event
Results

- Integration of Technologies: TinyOS + TOSSIM + Python + Pygame;
- Development of robust applications in WSN;
- The aid of a GUI facilitates:
  - Monitoring the environment;
  - Visualization and interpretation of data captured by the sensor nodes;
  - The process of decision making.
Finals Considerations

- Search of technologies for development and simulation in WSN;
- Developed a simulation environment for WSN;
- Case Study: Irrigation in football fields.
Questions?

Thank you!
Future Works