

WSN as a tool for supporting Agriculture in the Precision Irrigation

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SUMMARY

- 1 INTRODUCTION
- 2 RELATED WORKS
- 3 CASE STUDY
- 4 RESULTS
- 5 CONCLUSION



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 umidity;
 - 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.



CASE STUDY

Application Architecture

- Components native language NesC;
- Interconnected by similars interfaces;
- Main component: IrrigaçãoAssistidaAppC
- Main interface: AMControl.

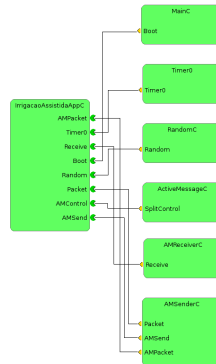


Figura 1: Application Components Architecture



CASE STUDY

User Interaction



Figura 2: Application Interface Graphic Elements

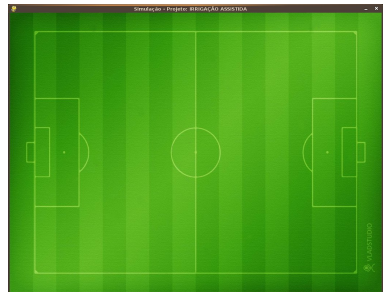


Figura 3: Field's initial situation



CASE STUDY

User Interaction

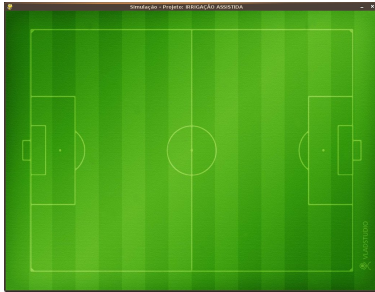


Figura 4: Field's initial situation



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

