TÉCNICO LISBOA

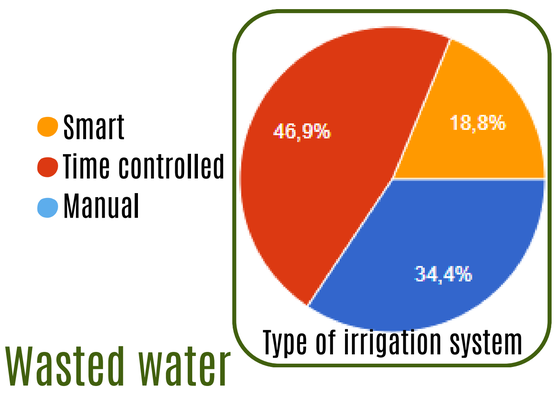
OSI- OPTIMIZING SMART IRRIGATION

Thousands of farmers water their plants through schedule or by hand, OSI creates a solution

● Culture oriented ● Fully autonomous ● Solar Powered ● Expandable ● Direct User Interface

Problem

75% OF THE INQUIRED FARMERS DON'T HAVE A SMART IRRIGATION SYSYEM



Wasted water

- Traditional irrigation methods can waste up to **50%** of water, directly affecting your yield and profits.
- Many farmers in regions plagued by drought and water scarcity struggle to keep crops alive and healthy.

Environmental Damage

- Inefficient irrigation leads to runoff, soil erosion, and depleted resources, harming the land you rely on.

Precision Irrigation

- Outdated irrigation systems fail to provide the precise water levels crops need, leading to problems that compromise their health and yield

Solution

Our prototype merges real-time soil data, weather forecasts, and evapotranspiration.

By combining all this data, the decision algorithm decides if there's a need to irrigate

Algorithm Parameters

- IPMA API Information;
- Humidity Levels of Soil;
- Weather forecasts.

IPMA Instituto Português do Mar e da Atmosfera

Decision Making Process

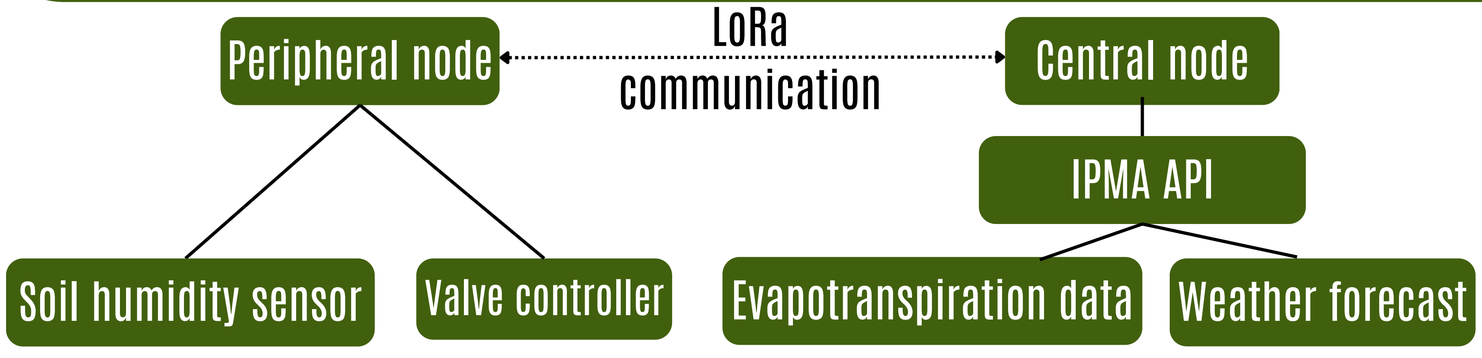
- A threshold is set depending on the crop and soil;
- The weather forecasts is saved;
- The pairing of likeliness of rain with the current level of humidity in the soil creates a value to compare with the threshold of the crop.

Recipients

- Large Scale Agriculture
- Domestic Gardening
- Greenhouses
- Public Parks



Product



- Once a day the peripheral node sends the soil humidity information to the central node;
- After receiving this information, the central node decides wether to irrigate or not based on the IPMA API data;
- The valve controller is activated based on the central node decision
- All this information is then sent to the app.

- LoRa communication enables long-range transmissions up to 10km;
- Central node can manage several independent peripherals, enabling a more precise monitorization of each field;
- The system operates entirely autonomously, requiring minimal human intervention.

Application

- The user defines the type of soil and crop;
- The app sends this information to the central nodes;
- Every time the peripheral node makes a reading, its information can be seen in the app as well as the weather forecast and the decision made by the central node

Solar powered

- Contrary to the central node, the peripheral ones are supplied by a solar panel;
- The solar panel charges a battery, safeguarding the situations where the natural light isn't sufficient to power the nodes;
- The battery can supply a node for 80 hours with a single charge;

Conclusion

OSI's impacts affect several domains

Environmental

- By only irrigating when needed, we can ensure that the water waste is severely minimized

Production

- By tailoring irrigation to a crop's specific needs, farmers can promote both plant and soil health, ultimately maximizing crop yields.

Profitability

- Spending less resources while improving production raises the profitability of the culture

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