TOUCH IOT WITH SAP LEONARDO PROTOTYPE CHALLENGE

AN AGRICULTURAL IOT APPLICATION

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This is adopted from the template provided for the Prototype Challenge included as part of the openSAP course “Touch IoT with SAP Leonardo.”
Samy is an experienced farmer who is not satisfied with the current way of doing his work. A keen learner, he realized from reading that digital technology, specifically IoT could help him to improve his productivity.

The conventional way of farming requires a lot of labor such as walking around the farm to check the health of plants and soil conditions etc. Among others, soil moisture level is one of the key parameters that could potentially be done with moisture sensors that only cost around US$2 per piece.

Samy also knows that if he can obtain real-time weather conditions through a weather station (cost around US$1000), he can then do the needed watering work remotely.

With soil moisture sensors, weather station and pump actuators connected and feeding information, coupled with SAP Leonardo platform, Samy’s need can be met quite easily at a very low cost.
Persona

Explain the needs, goals, and pain points addressed

Samy
The Farmer

“I like to improve my productivity with the use of new technology. That would enable me to do more with less.”

About
- 48, married with 3 children. Does farming for the last 10 years.
- Wanting to be a modern farmer that uses technology to improve productivity.
- Technology savvy and continuously exploring new ways of doing things.
- Had 13 years working as a construction engineering prior to farming.

Responsibilities
- I am the only person working on my family’s 5-acre land situated 4km from our house.
- I am responsible for ploughing, seeding, watering, pruning, harvesting and selling all the produce from the farm.
- I usually arrive at the farm at 7:30am and I spend the next 4 hours there before returning home for lunch.
- I sell my produce to 2 long term buyers near my house.

Main Goals
- To have a remote monitoring system over the condition of his farm, particularly, soil moisture content.
- To have a remote-control system that enable activating irrigation system without visiting farm physically.

Needs
- I often feel my work can be simplified if I can have a system that I can activate the irrigation system from home.
- For me not to waste water unnecessarily (yes, a lot of water is needed for 5 acres of land), I need to be sure which part of the land needs watering, i.e. soil moisture level is low.
- I am open for advanced application of IoT such as machine learning in the long term,

Pain Points
- Can’t be sure of soil moisture content without visiting the farm and check in detailed.
- Need to check the entire farm (5 acres!) to know which parts need watering. That takes a lot of walking and inspecting.
- Determination of soil moisture level is based on subjective judgement (i.e. using finger touches).
As a **farmer** I need a way to **monitor the soil conditions of my farm remotely** so that **I can activate the sprinkler system without physically at the field.**
### UX Journey
Describe Actions, Mindset, Feelings and Touchpoints

<table>
<thead>
<tr>
<th>ACTIONS</th>
<th>MINDSET</th>
<th>FEELING</th>
<th>TOUCH POINTS</th>
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</table>
| - Wake-up at 6:00am
- Look thru window to check weather | - “It’s a horrible dream!”
- “Beautiful day but no rain?” | 🙄 | - Bed
- Window |
| - Get ready to leave home
- Have breakfast | - “I need to bring lots of drinking water today!” | 😊 | - Kitchen
- Dining table |
| - Drive 4km to JM Farm
- Enjoy the lush scenery | - “I can see dark clouds are forming at the horizon.”
- “Possible rain this afternoon?” | 😋 | - Truck
- Road
- Traffic
- Scenery |
| - Arrive at farm
- Check soil moisture by walking around. | - “Only potato & chili need watering.”
- “The bananas and mangoes are maturing.” | 😏 | - Gate
- Path in farm
- Various plants
- Various vegetables |
| - Irrigate plants | - “5 acres of land is a lot to cover. I’m tired.”
- “The pump is a little noisy. It’s 2 years since I bought it.” | 😞 | - Water pump
- Water tap
- Water hose |
| - Harvesting
- Leave farm for market | - “This is a good day for me. The truck is full!”
- “How much would the buyer willing to pay for my bananas?” | 😌 | - Baskets
- Truck |
Prototype
Prototype screens for an Agriculture IoT application

Solution Concept
Samy needs to have an agriculture application that enable him to monitor the soil moisture level coupled with the functionality of activating his farm irrigation system remotely. An IoT solution with SAP Leonardo at its core connecting to soil moisture sensors, all-in-one weather station, and water pump actuators would be able to meet the stated requirements with the potential to further scaling up and enhancement.

Solution Architecture
There are 3 major parts of the solution architecture:
1. Site Components: soil moisture sensors, all-in-one weather station (e.g. Acurite), pump actuators (for irrigation), internet connected computer (possibly Raspberry Pi) for edge processing and act as the gateway
2. Back-End System: hosting the core technology stack, SAP Leonardo on SAP Cloud Platform
3. Client or Mobile tools: user-side mobile app that is tablet / smartphone enabled
SAP Connected Goods App

SAP’s award winning Fiori app framework significantly reduces development time while ensuring delightful user experience. SAP’s digital core technology promises future extension such as scaling up by adding more sensors / actuators and the use of machine learning that could automate the entire farm operations. Below are 2 simple screenshots as prototype for Release 1 of the project: