Groundwater Wells: The Untapped Edge Use Case

Doug Standley - Niolabs

www.tinyML.org
Deep Sky Vineyard: Quantified Results

**Customer Engagement**
- 90% Pivot from Wholesale Only to Direct to Consumer
- Tasting Room Experience

**Targeted Marketing**
- 1:1 Consumer Loyalty
- Distribution to Retail

**Direct Rol**
- Sell More
  - Yield +40%
  - Quality +50%
  - D2C Experience
- Cost Savings
  - Water -75%
  - Labor -40%
  - Energy -20%
  - Quality +50%

**New Business Services from data observations**
- 100% Reactive to 100% Proactive, Predictive, Automated
- Lower risk creating investment confidence to shift From wholesale to D2C

**Build Better Products**
- Precision Quality
- Vertical Integration Into Brand Experience

**Enhance Brand**
- DSV now a designate
- Business Model Pivot
- High-touch Experience
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Problem Statement:
• It is widely known that agriculture’s current usage of fresh water is unsustainable (~70% usage & ~70% waste)
• Today, agriculture water usage is widely unmonitored
• Specific to groundwater wells (50% source for agriculture): ~39-million wells worldwide 6-20% at risk of going dry*
  • Arizona Use Case: 250k statewide
  • Lack of regulation & technical solution
* Jasechko et al, Science 372 (2021)

tinyML solution:
• Niolabs have successfully demonstrated edge to cloud application and high-impact results over the past 5-years.
• Incorporation of TinyML within the Gen.2 solution architecture helps drive repeatable, scalable advancements and user adoption.
  - Incorporate a well specific demonstration application within the total farm
• Leveraging distributed computing, niolabs’ have demonstrated improved: conservation, yield, and quality

Impact:
• ~10% loss of available fresh water globally
• There are no alternative sources for replacement fresh water once wells go dry
• Loss of food production, impact on nutrition quality, and loss of available drinking water + economic loss
• Mass flywheel impact on broad sustainability matters far beyond the agriculture sector

Call to Action:
• niolabs will complete a Gen.2 re-architecture March 2022
• The goal is to deploy a repeatable solution for the digitalization of a total farm and feature a well specific solution product and service.
• niolabs seeks assistance and support from the TinyML community to provide deep SME and application support within the reference Gen2 solution architecture and Gen.2 farm research application.

A nio service uses data from sensors in the soil in combination with the farmer’s observations to autonomously control the vineyard pump and valves, delivering the optimal water flow to...