

Sensor Analytics in the Water System

Detect Leakage and Find Unknown Pipes

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Abstract/Opportunity

Pipe Leakage



How to find it?

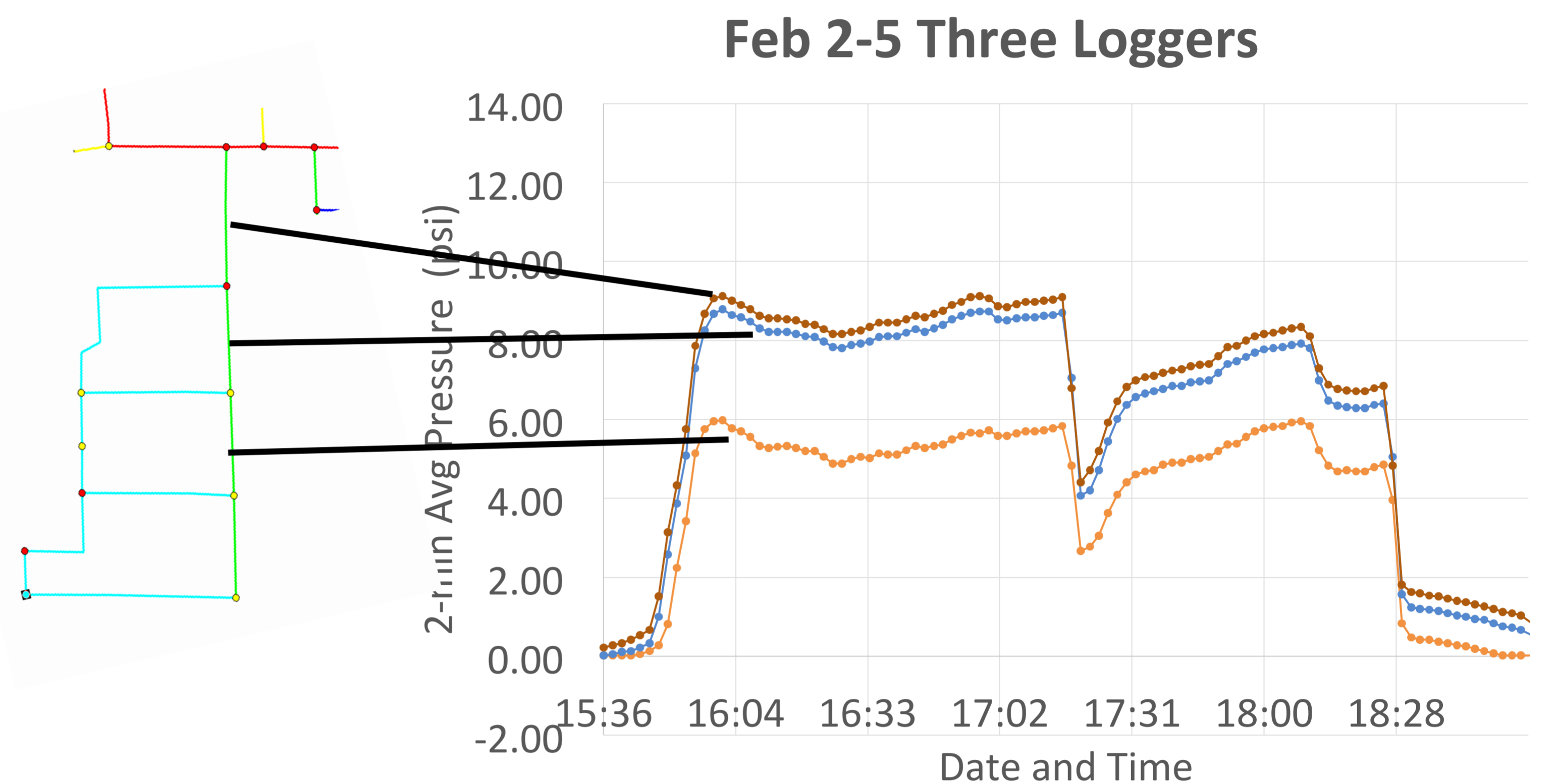
- Traditional: Human – Inefficient
- Modern: Helium Detection- Expensive
- Future:

Pressure logger + Computer



Data/Results/Prototype

Field Pressure Data



- Measured in India
- Three hours supply
- Three pressure loggers are installed, data is shown as right

Proposed Solution

Pressure Behavior:

$$\frac{\partial A}{\partial t} + \frac{\partial Q}{\partial S} = 0$$

$$\frac{\partial v}{\partial t} + g \frac{\partial h}{\partial s} + v \frac{\partial v}{\partial s} = g(i - J_f)$$

Pattern Recognition

- If there is an unknown branch pipe, how can it affect pressure behavior locally?
- If there is a leaking location, how can it affect pressure behavior locally?

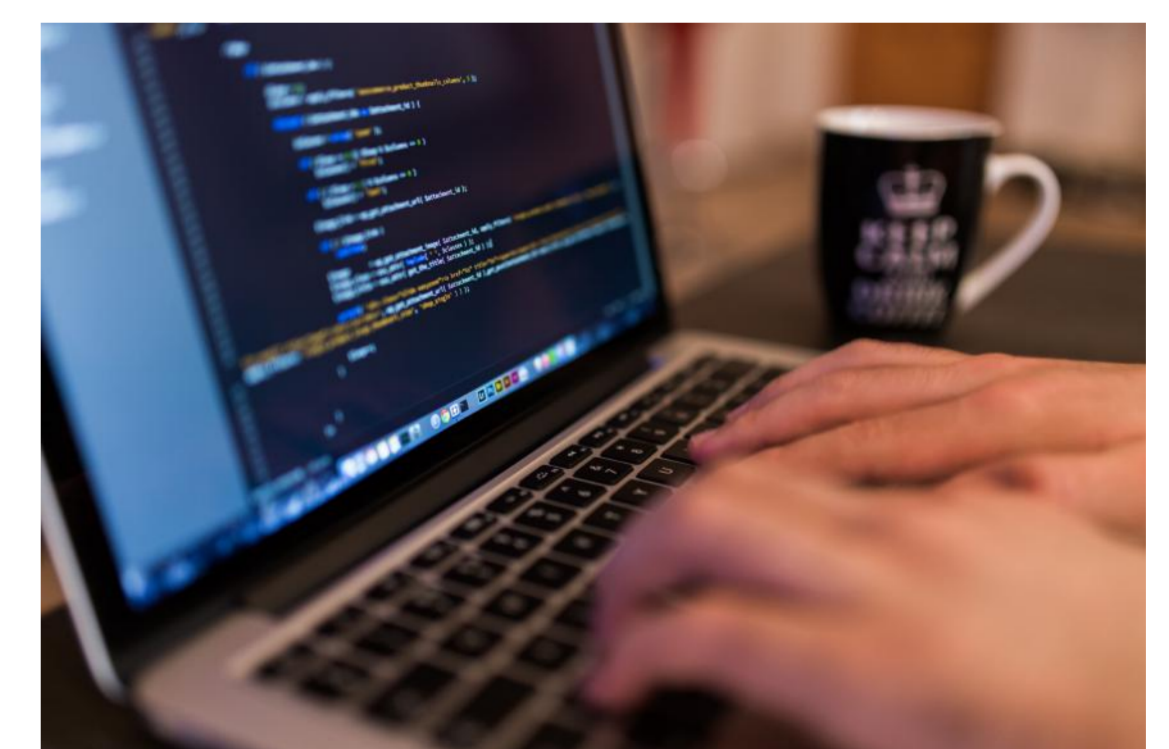
Value Proposition

- Find leakage and unknown pipes timely with low cost
- Help save water and provide basis for 24x7 water supply



Next Steps

- Numerical Simulation:
Using numerical model to match field data



Acknowledgments

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References

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- [2] Pimpri-Chinchwad Helium Gas-Based Leak Detection Pilot (p35). (2015).