The Brave New World of Apparent Water Loss: Automation & Machine Learning
Introduction

- Water analytics company based in San Francisco, CA
- 5 Core Data Analytics Solutions
  - Hidden Revenue Locator
  - SMART Targets
  - Cutoff Analyzer
  - Water Rate Simulator
  - Water-Energy Nexus Calculator
- > 500,000 meters under management
Background
HIDDEN REVENUE LOCATOR
AKA “APPARENT LOSS DETECTION TOOL”
Machine Learning Approach

**Data Inputs**
- Historic and current meter and billing data

**Machine learning/AI**
- Data analytics powered by machine learning, to produce informed decisions, recover revenue, reduce costs

**Industry Intelligence**
- Insights driven by industry expertise including knowledge of consumption patterns, AWWA specs, weather impacts, hardware specs & anomalous use

**Intuitive Dashboards**
- Actionable insights are displayed over the web via intuitive dashboards. Analytics are relevant and allow for revenue recovery

**Operational Interventions**
- Predictive alerts, prioritized operational schedules for repair and replacement, field inspections, validation reporting, and 3rd party testing

**Outputs**
- Revenue Recovery
- Operational Efficiency
- Informed Operators
- Happy Customers
Case 1: Clayton County Water Authority
Project Details

• CCWA Apparent loss management goals
  • Revenue Recovery opportunities
  • Business Process Improvement
• ‘Software as a Service’ Solution
  • Hidden Revenue Locator
  • Monthly meter and billing data
• 6 month pilot (May-Oct 2016); Historical data analyzed
• Uses data to identify apparent loss, per meter
CCWA Meter Fleet Info

• 99+% AMR (Beacons)
• 99+% Mechanical drives
• Installed 2008 -2013
• Compound meters
SaaS Delivery Process

• Best Practices
  • Staffing: Identify all stakeholders
  • Data Integration: Automate
  • Quantify Value of Pilot
  • Portal Training
  • Validation procedures (M6 & M36)
# Meter Under-registration

## Non-Residential Results

<table>
<thead>
<tr>
<th>Meter Size (inches)</th>
<th># Discrete Flags (6 month total)</th>
<th>Revenue Amount (6 month total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.625</td>
<td>148</td>
<td>$7,484</td>
</tr>
<tr>
<td>0.75</td>
<td>74</td>
<td>$2,590</td>
</tr>
<tr>
<td>1</td>
<td>83</td>
<td>$5,908</td>
</tr>
<tr>
<td>1.5</td>
<td>111</td>
<td>$45,000</td>
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<tr>
<td>2</td>
<td>101</td>
<td>$141,000</td>
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<tr>
<td>3</td>
<td>30</td>
<td>$3,524</td>
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<tr>
<td>4</td>
<td>23</td>
<td>$2,114</td>
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<tr>
<td>6</td>
<td>46</td>
<td>$86,023</td>
</tr>
<tr>
<td>8</td>
<td>35</td>
<td>$4,374</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>$622</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>657</td>
<td><strong>$299,038</strong></td>
</tr>
</tbody>
</table>

As percent of non-residential meters: 14.8%

Average $ value per meter: $67.6
Results

- 8 Indicators Presented
- Meter Under-registration yielded largest value
  - n=75,911 meters
  - Estimated $754,424 revenue discrepancy
- Validations
  - Decision to validate “Top 100” flags
  - Use M6 Guidelines
Case 2: Los Angeles County Utility

- Investor owned Utility
- 90,000 meters
- Pilot on 500 meters
Summary Results – Validated Correct

• 86% Hit Rate
  • 6 Correct, 1 Incorrect

• $8,522 of Revenue Loss Identified from 6 Validated Correct Flags

• 18.7% Additional Revenue that could have been billed and collected
  • $45,518 Total Amount Billed After 6 Flags First Identified
* Value Add: Voiced by CCWA & LA

• Ongoing data analysis → Prompt issue identification and resolution

• Cutting Edge and Cost Effective Technology

• Third party guidance for Operations on validation best practices

• New perspective to Meter Replacement programs
  • Optimize current process
  • Independent input to gain the most from new meter investment (e.g. AMI)

• Potential to set and hit Revenue Enhancement program targets

• Potential to demonstrate high ROI
Meter-data Analytics Utilities

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