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Xeros – Machine Data Acquisition and Analysis

Objectives and Challenges:

Our client manufactures a revolutionary new laundry machine that uses 80% less water, fewer chemicals and is more efficient in cleaning articles than competitive machines. This machine is the first real advance in laundry machine technology in 50 years. To accelerate sales opportunities they needed a way to measure the utilization and performance of competitor machines and the ability to compare with promised services levels against their proprietary machine.

To complicate the design challenge, no modifications to the competitor machine could be done. The total solution installed, including labor, had to be less than $1000. Xeros clients and other authorized third parties would need access to the performance data of the both the Xeros and Competitor machines, to monitor SLAs in the contract and rebate awards by municipalities and utilities.

Long-term opportunity was to build a branded business on optimizing laundry services using the data collected from the various sensors to determine the details of the laundry being washed, efficiency and productivity of staff, and other key metrics.

Xeros clients would require a simple self-service web site design to graph at various levels of details the comparison against theoretical and actual results based on the type of laundry (formula) being processed. The sensor package, data acquisition equipment and cloud integration had to be simple to install and remove, run unattended and require no extra operator intervention, and reliably send data to the cloud-based back end systems for analysis.

Elyxor Approach:

Elyxor, working with its hardware partners, led the R&D effort to design passive sensors and a data acquisition devices to measure input from laundry machine relays, valves and utility meters. Elyxor took an iterative approach to the hardware design, from bench testing several approaches, simple field trials using off the shelf components, then scaling up to custom build components that could be hardened for hash environments and manufactured at volume to bring the cost into alignment.

The sensors, data acquisition hardware and cloud integration software was designed and developed by Elyxor to be pre-configured, installed on location by a technician with simple instructions and minimal training. Configuration and setup is designed so that it can be completed remotely by an admin once connected to the Internet by the onsite technician.

Elyxor designed a simple machine learning tool that interpreted the sensor data and determined the classification of the formula the machines are processing. The tool using the classification, would then measure the actual performance against expected results. Data results are made available to Xeros customers through a simple to use web application, graphic the results on a dashboard that

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would allow the custom to compare and contrast similar loads across machines, show Xeros performance against an agreed to SLA and display service notes from technicians.

Xeros management and operations staff used a web application that displayed more detailed data. The operating dashboard displayed a Stop Light (Green, Yellow, Red) for each customer that could be drilled down to an individual machine to display information about the state and performance of the machine, service history, and other information required to give the operations team insight into the machine.

Results

A simple, very cost effective and scalable solution for the field technicians to install at prospect and customer sites. Passive sensors can be installed and removed from competitive machines with no modifications to the machine, eliminating any liability issues. Costs for the data acquisition packages with installation was less than $750 achieving our goal to have the costs at scale below $1000.

Simple to use admin tools to configuring the learning engine which properly interprets what the machine is processing and how it compares to competitive machines and SLAs. We build a data exception tool that allowed the system admins to review sensor readings classified as unknown and mass classify them to improve on the quality of interpreted results.

Xeros would use the tool to install on competitors existing machine in a prospects location for free, then measure the results against a set of expected results if the prospect was using a Xeros machine. The resulting savings in water, sewage, chemical and power were then used to build a proposal and SLA, which usually include rebates from the local municipality and utility used to offset the cost of the Xeros machine.

Measurements such as water usage, total chemical, runtime, vibration, motor heat among others could be used to determine the current operating state of the machine and begin to predict when service would be preemptively required. Operations could monitor any machine in the network, in real-time, to meet operating SLAs and customer satisfaction levels.

Xeros was awarded several patents related to the processes and technology created for the data acquisition systems designed by Elyxor, with Elyxor's Managing Partner, Mark Carleo, listed as the inventor.

http://www.xeroscleaning.com/sbeadycare-connect