



Technology Labs

Remote Sensor Network

Accenture prototype helps Pickberry Vineyard improve crop management

While the Internet has truly revolutionized the way information is gathered and disseminated globally, we have yet to reach the ultimate destination on the information highway. Sensors have opened a new lane that promises to extend the Internet's capabilities to include all physical objects and—potentially—all living things.

The proliferation of sensors is part of a technological phenomenon that Accenture calls Sensor Telemetry, which refers to the use of sensor technologies and two-way wireless communications to gather intelligence from products, people and places, and transform it into value-added business insights.

Accenture Technology Labs, Accenture's technology research and development organization, developed the Accenture Remote Sensor Network prototype to

demonstrate the far-reaching potential of Sensor Telemetry, and then field-tested it with Pickberry Vineyard, a premium grape grower in Northern California, USA.

The Accenture Remote Sensor Network is a wireless mesh network of sensor nodes that can be spread across any area (from a factory to a forest floor), enabling organizations to gain unprecedented visibility and insight into product conditions and operations.

Using sensors to harvest crop insight: a case study

To demonstrate how the Remote Sensor Network functions in a rugged, real-world environment, the Accenture Technology Labs' R&D team launched a field test with Pickberry Vineyard. The test involved embedding a network of wireless sensors across a 30 acre area to continuously sense humidity, wind, water, and soil and air temperature.

Data gathered from the vineyard is relayed via a self-organizing wireless network application, adapted from Millennial Net¹ technology, to a base station and transmitted back to the Labs via cellular uplink. Because the network is self-organizing, it can be easily expanded by adding new nodes, with no configuration work required.

Some of the challenges the Accenture team overcame during testing included protecting the hardware from the elements and rodents, ensuring the reliability of the communication link and, most importantly, building the right insight applications needed to make data useful for decision-making.

Accenture developed a web portal that provides users with dynamic reports, alerts, and historical graphs. Users can also build customized reports in Excel that are updated automatically through Web services. These intuitive tools turn real-time data into actionable insight for Pickberry's decision-makers and other concerned parties.

The benefits of remote "sensor-ship"

The Remote Sensor Network provides Pickberry with the ability to:

- make calculated decisions—almost vine-by-vine—thanks to the granular level of the data obtained in near

real time. For example, Pickberry can use the data to adjust watering schedules for a specific area;

- combine vineyard data with other data sources. This enables Pickberry to manage operations and resources, such as water usage, more scientifically. Live data on soil moisture and air humidity can be correlated with weather forecast data to match estimated water demand with well supply;
- detect potentially devastating events such as frost, disease and pests early on. Armed with insight provided from sensor applications, Pickberry can take immediate action.

These capabilities lead to more effective crop management, lowering costs while raising product quality.

Accenture Sensor Telemetry Accelerator

The Accenture Remote Sensor Network was built using a reusable, scalable software infrastructure that was piloted during this and other field tests and can be easily adapted for other organizations looking to benefit from new remote monitoring capabilities. The resulting Sensor Telemetry Accelerator or "starter kit," enables companies to build sensor-based applications using sensors, mesh network nodes and off-the-shelf and proprietary software to quickly deploy a remote monitoring application with minimal software development investment.

Achieving high performance from miniature sensors across industries

Companies in almost any industry can use the Sensor Telemetry Accelerator to achieve higher performance through:

- improved safety and security;
- heightened product or asset interaction leading to improved

- utilization and performance;
- advanced predictive maintenance.

Utility companies could use Sensor Telemetry to help avert energy crises by monitoring the structural integrity of high-voltage electrical towers. Utilities could then redeploy manpower normally used for manual preventive maintenance inspections. Oil concerns could automatically monitor pipeline corrosion.

Government agencies could use sensors for a range of activities from monitoring street light outages to detecting insect infestations before they spread.

Manufacturers could use insight gained from sensors to predict mechanical failures and potentially prevent disasters, reducing costly downtime and eliminating the need for routine manual checks. Moreover, insight on product usage could be used to improve quality, generate new or additional products, or be sold to third parties.

Transport companies are already making use of sensors and wireless networks to determine the location of freight and its surrounding environment in real time. This is particularly critical in transporting hazardous or sensitive materials, or in tracking commodities that fluctuate in price from day to day.

Contact

Contact Bill Westerman at william.w.westerman@accenture.com to learn more about how the Accenture Remote Sensor Network prototype and Sensor Telemetry Accelerator starter kit can improve your ability to monitor valuable business assets anywhere, anytime.

About Accenture Technology Labs

Accenture Technology Labs, the technology research and development (R&D) organization within Accenture, has a 16-year track record of turning technology innovation into business results. The Labs create a vision of how technology will shape the future and invent the next wave of cutting-edge business solutions. Working closely with Accenture's global network of specialists, Accenture Technology Labs helps clients innovate to achieve high business performance. The Labs are located in Chicago, Illinois; Palo Alto, California; and Sophia Antipolis, France.

For more information, please visit our website at www.accenture.com/accenturetechlabs

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¹Millennial Net, Cambridge, Massachusetts