Customer Problem

The packaging materials made by the company require stringent quality control with regards to air temperature, gas level concentrations and other environmental variables. This is because the company has to meet health legislation and international standards with respect to food safety and hygiene.

FDA regulations mean that maintaining a high quality level is a must throughout the production process. In many cases, this means that costs go up while ensuring optimum quality.

Smart Factory Solution for Efficiency and Regulatory Compliance

The Softweb solution involved installing wireless sensors throughout the factory and integrating them via an Internet gateway to monitor critical processes and environmental variables.

The implementation of Microsoft Azure services also gives the client cloud-based predictive analysis.

The company can now monitor environmental variables such as air temperature in the area where the printing machines are located, light intensity on the final products and CO2 concentration in the workers area.

The integration of these sensors with the Microsoft Azure cloud platform allows data from the sensor node to be transmitted directly to the cloud for analysis and is used by the company for different applications.

Softweb Solutions also created mobile apps which fetch data from Azure and help the factory floor supervisors and management monitor the factory environment in real-time.

How the Smart Factory Works

During the printing process, it is important to control the drying temperature of the ink, because if the ink is not completely dry, it can ruin the impression on the material and result in complete rejection of the production.
Internet of Things
Case Study

The temperature also affects the elasticity of the materials being used in the preparation of the packaging materials. It affects the laminating process since it involves pressing together three layers of plastics to make the final product strong and impermeable.

- The temperature sensors help the company maintain a high sampling rate and a high rate of accuracy in the readings.
- The humidity sensors are required to monitor the humidity levels which can affect the flexibility of some of the materials which have their base in the water-soluble synthetic polymers.
- The light sensors are needed to keep constant luminosity and are also calibrated for color analysis. This is because color looks different depending on the ambient light in the factory floor.
- The sensors measure the volatile organic compounds to ensure compliance with food safety standards.
- The noise sensors have been installed to monitor working conditions in the factory.
- Vibration sensors monitor the machines to ensure they are working normally. Any abnormal vibrations result in alerts being sent to the designated employee to check on the machine.

Internet Gateway Connects Data to Microsoft Azure

The Internet Gateway is set up and configured to transmit all the data to the cloud and is capable of communicating with different communication protocols. It receives sensor data from the nodes installed throughout the factory and uploads it to the cloud.

The use of Azure allows the company to start uploading the data without the need to configure their own server system.

This also allows the data to be accessed from anywhere. Azure gives the company the ability to have a plug and play install and immediate data availability.

Automated Decision Making with Predictive Analytics

The company is using Azure Machine Learning with R Analytics for its existing legacy systems as well as for the sensors installed in the factory.

This gives the company cloud-based predictive analytics. The main benefit of predictive analysis comes from the sensor data that is being analyzed.

The sensors for temperature, humidity, light, VOC, noise and vibration keep sending data that is stored in the cloud and based on predictive analysis certain processes have been automated.

The company now knows when certain types of packaging materials are more vulnerable to higher temperature and humidity.

With the implementation of Azure Machine Learning, the machines can alter course without the need for human intervention. This saves time and resources since sending alerts and then expecting the supervisor to send new work orders is eliminated.
The data gathered from vibration sensors allows the company to predict how certain machines are going to react during the production of different types of packing materials.

The factory can also optimize its energy usage based on biometric scans of the employees’ login and logout times, including break timings to predict when to switch on the lights and HVAC systems and at what temperature.

This shows that predictive analysis is not just limited to sensors but can also be integrated with other systems.

**About Softweb Solutions**

Softweb Solutions Inc. is a Chicago based tech consulting and development company working with organizations across the world to implement the best-of-breed solutions and processes to help them meet their business challenges.

Over a decade of experience with the world’s leading companies has provided the expertise to offer strategy, design, engineering solutions and R&D services to companies in every industry.