Monitoring Liquid Levels in Reactor Vessels with Video Analytics
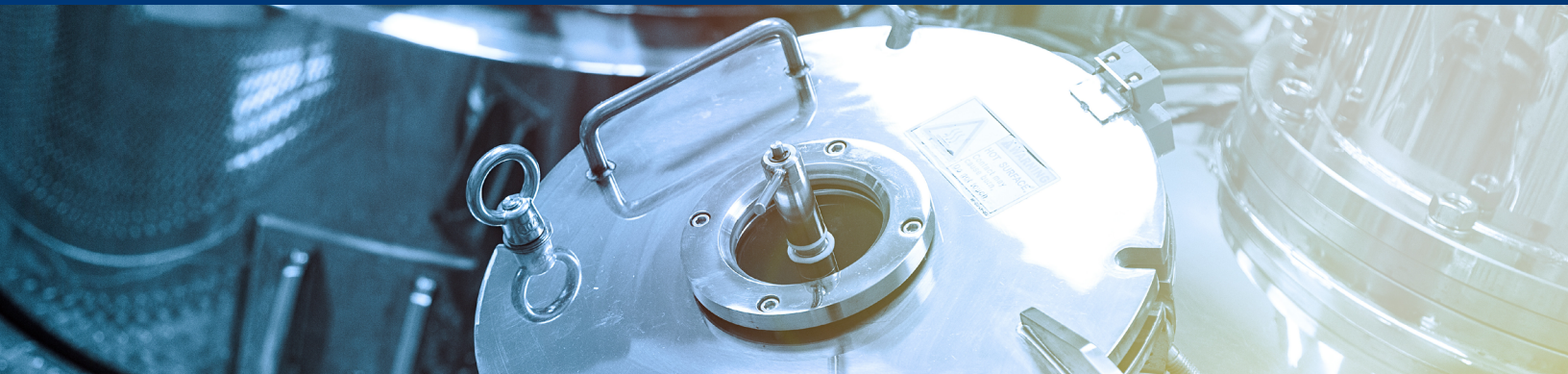
IVC's video analytics solution transmits the current liquid level to the process control system and generates an alarm when the liquid level crosses a pre-defined threshhold.

Introduction

In industrial settings, monitoring the liquid level in reactor vessels is critical for maintaining process efficiency and safety. However, traditional sensors are often not suitable or fail in harsh environments, necessitating innovative solutions.

This application note describes the use of video analytics to monitor liquid levels in a reactor vessel when internal sensors are impractical due to the nature of the reaction.

Video Analytics System Overview

IVC's video analytics system consists of an industrial video camera positioned to monitor the reactor vessel through a sight glass, and advanced video analytics software that processes the video feed to accurately determine the liquid level. The system performs two primary functions:
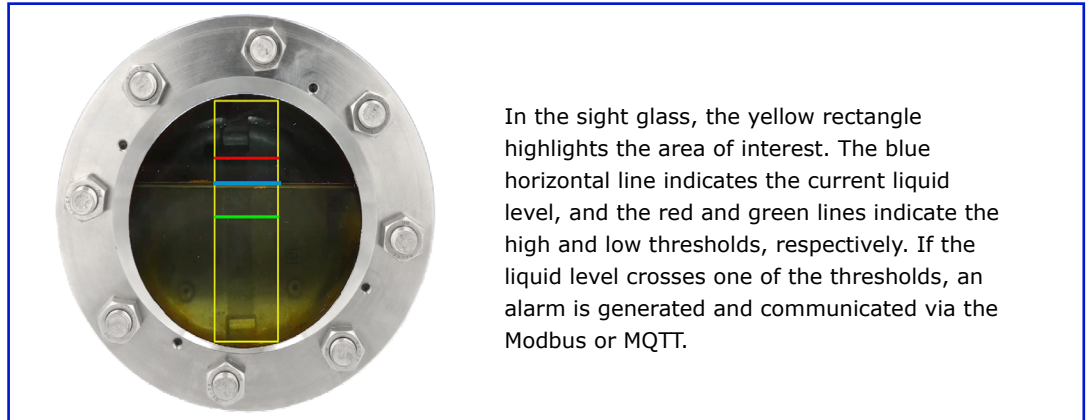
1) Transmits the Liquid Level: The current liquid level is relayed to the process control system continuously via the Modbus or MQTT protocols. The level is specified as a percentage of the sight glass height, with 1% representing the bottom and 99% the top.

2) Generates Alarms: The software allows for setting high and low threshold levels. Alarms are generated when the liquid level crosses these thresholds and are sent via Modbus or MQTT. Visual and audible alarms can also be generated.

Features and Functionality

- **Area of Interest:** To configure the system, users define the section of the sight glass to be monitored by simply dragging the corners of a rectangular overlay on the video display monitor. The upper and lower thresholds can then be positioned by moving the threshold lines up and down.

- **Real-Time Display:** The current percentage level is displayed on the monitor, and is updated continuously.

- **Multiple Algorithms:** In addition to a default algorithm, three additional algorithms are available to refine measurements.

- **Confidence Level:** Each reading includes a confidence level which can be used to minimize false alarms caused by external factors such as variations in lighting or shaking.

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Monitoring Liquid Levels In Reactor Vessels with Video Analytics (cont'd)

In the sight glass, the yellow rectangle highlights the area of interest. The blue horizontal line indicates the current liquid level, and the red and green lines indicate the high and low thresholds, respectively. If the liquid level crosses one of the thresholds, an alarm is generated and communicated via the Modbus or MQTT.

Accurate and reliable liquid level measurements.

Define an area of interest and threshold levels with just a few mouse clicks.

Implementation

The system integrates seamlessly with Industrial Video & Control's (IVC) video management software for ease of use. The video analytics software processes the video feed in real-time, providing accurate and reliable liquid level measurements.

Intuitive User Interface

An intuitive interface makes it easy to define an area of interest, resize it and adjust the threshold levels with just a few mouse clicks. Advanced features such as defining the color range to be analyzed and setting the detection method can be easily fine-tuned to match the detection conditions.

Benefits of Video Analytics In Industrial Environments

Video analytics offer several advantages for industrial applications:

- **Non-Intrusive Monitoring:** Ideal for environments where traditional sensors cannot be used.

- **Real-Time Data:** Provides immediate feedback and allows for quick decision-making.

- **Enhanced Safety:** Automated alarms help prevent overflows and other hazardous conditions.

- **Cost-Effective:** Reduces the need for expensive and maintenance-intensive sensors.

Conclusion

The use of video analytics to monitor liquid levels in reactor vessels not only enhances safety and efficiency but also demonstrates the versatility of this technology. IVC's solution integrates seamlessly with existing process control systems, providing a robust and reliable monitoring tool.

For more information

To learn more about IVC's video analytics solution, please visit www.ivcco.com.

About IVC

Founded in 2001, Industrial Video & Control is a leading supplier of video cameras and video management software specifically designed for industrial applications. The company's IP-based video solutions are used by customers worldwide for process evaluation, remote monitoring, personnel safety, site security, and regulatory compliance. IVC's success in the market has been driven by high-quality products, cost-effective solutions, and outstanding service. Based outside Boston, MA, IVC is an ISO 9001:2015 certified company.