



ELEMENTARY VISION

By Elementary Systems

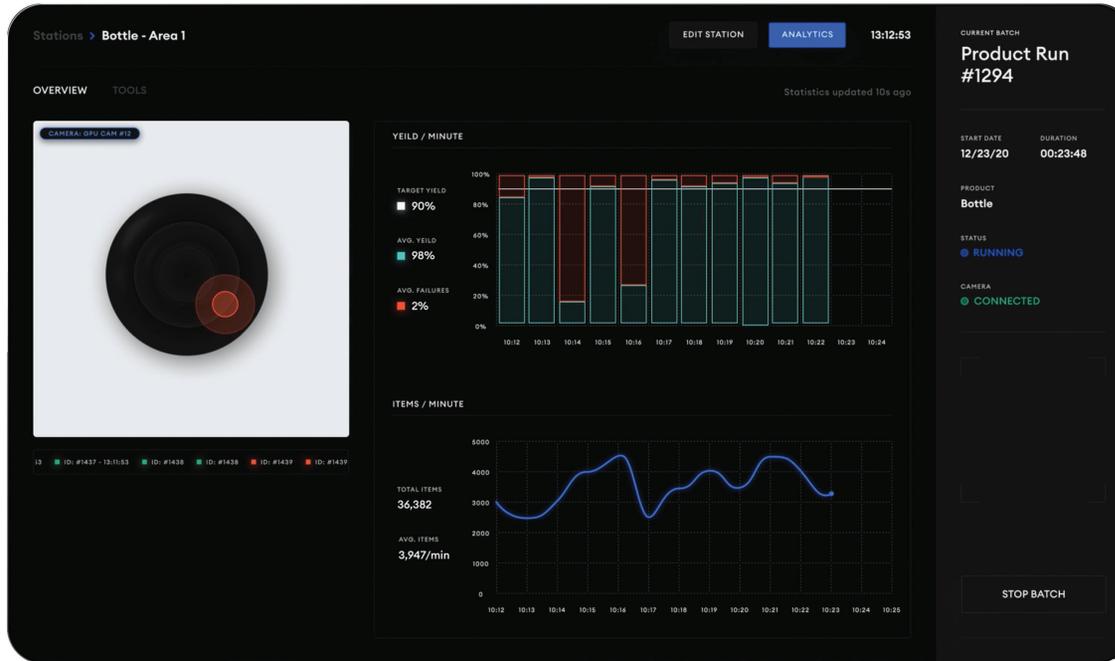
It is impossible to overestimate the critical nature of keen and constant visual inspection in any production process. That's why an advanced vision system is vital for any of today's advanced production lines – as well as for “yesterday's” older and more issue-prone lines. When a defective process, fault, or crash occurs in a system, time is at a premium and even a slight delay can cascade into a costly defective product pile up. As such, an advanced visual inspection system must be deeply intelligent, instantly accessible, immediately actionable, impenetrably secure, and easy to operate.



While cloud computing has led to a paradigm shift in how industries operate, many businesses have taken a gradual approach to adopting and adapting to a cloud-based architecture. Current outdated systems are tied to one computer or workstation for their programming and operations. For many industries outside of manufacturing a transition to the cloud has been an easy decision. But, due to the complexities of manufacturing processes and how inspections are performed, using cloud tools has been a low priority and a heavy lift. Increasing demand for higher volumes of goods while maintaining low fallout rates has forced the conversation to include smart tools to increase productivity. Now, the combination of cloud tools, reliable platforms and ease of operation for the user has exponentially enhanced key factors including security, monitoring production, accounting, management operations, and overall efficiency.

With a cloud-based (SaaS) system, creating or managing vision-based hardware and software is greatly simplified and helps dramatically lower expenses when compared to the cost of housing, maintaining, or staffing in-house systems. This, coupled with high availability, reliability and the decreasing cost of cloud services, makes it possible for a company to efficiently manage its visual inspection technology for operation at any time and from anywhere in the world.

Machine vision is becoming commonplace in passive applications such as quality inspections by helping to transition from sample-based checking where 10% of product is typically inspected, to 100% checking without decreasing quality. Most machine vision systems rely on multiple technologies and systems integration that include both hardware



and software products, as well as human resources, actions, and expertise, but it's the Artificial Intelligence (AI) element that is quickly helping vision systems become fast and accurate while requiring minimal training.

To that end, Elementary Systems, Pasadena, CA (<https://elementarymyl.com>), has developed its highly advanced, full stack, cloud-based vision system for virtually all types of

production lines. The system can be quickly deployed with no SI or team member involvement to inspect just about any product, and leverages AI to improve point-to-point quality assurance and streamline workflows.

A UNIQUE APPROACH

Many production systems managers conflate machine vision with AI vision, but the systems are distinct from each other. While machine vision gives a computer the ability to see, AI vision is able to look at a series of images and attempt to gain an understanding of what it sees, much like a human would. The approach is becoming the preferred method for addressing evolving processes in industrial automation, bridging the gap from rules-based machine vision to more intuitive quality checks allowing for



AI vision to cover complex use cases that rules-based machine vision hasn't been able to in the past.

Current vision systems also typically require rigid configuration of hardware and software which may include hard-coding. Such configurations take time to set up and if a camera gets jostled or damaged, production can be interrupted. The result is a costly, time-consuming restart often involving specialized personnel or outside experts. Adding an AI vision system with an intuitive user interface and no-code programming tools, coupled with the ability to quickly re-deploy machine learning models by anyone quickly delivers ROI by eliminating the risks associated with rigid setups. This level of simplicity is at the heart of every vision system from Elementary.

SIMPLE SET UP

Native to a cloud-based paradigm, the Elementary visual inspection system is an easy-to-train, easy-to-use solution that allows for closed-loop quality inspection. Set-up and operation does not require a programmer. Instead, the process is nothing more strenuous than point and click data labeling. Elementary systems leverage a powerful camera system that integrates with AI to leverage machine learning and the cloud to consistently improve on QA workflow. They automatically engage AI algorithms to deliver new levels of intelligence to the inspection workflow. Taking advantage of a machine learning system allows the inspection and adjustment process to stay simple, while doing the complex work of constant fine-tuning and improvement on a continuous basis.

CASE STUDY

Manufacturers are attempting to modernize their operations, driven by consumer demand for more environmental-friendly products and packaging. This is creating a real challenge for productions looking to switch over from plastic to more environmentally friendly materials. For one client, this was adding to the complexity and frequency of their production changeovers. Each changeover required a new system calibration, and involved specialized personnel and time. Installing an intelligent AI vision system allowed the production line to be “retrained,” up and running in a matter of hours versus days, allowing for a seamless transition and rapid ROI. Problem solved!

DATA YOU CAN USE

Many companies have a traditional vision system in place, but the data is siloed and therefore not being used for broader, closed-loop quality measures. Elementary’s easy-to-use software, deep-learning AI, and cloud analytics are built to capture specific visual data, while delivering rapid, accurate, and reliable real-time findings and solutions.

New paradigms resulting from the pandemic are impacting quality inspections in their most innovative form. Online shopping, work from home initiatives and reshoring manufacturing all mean leveraging vision with remote capabilities. Industry experts are expecting businesses to grow, employing or upgrading vision systems. Streamlining the quality inspection process, while ensuring speedy flow of production and enhanced automation implementation will improve business and the bottom line. Now it’s possible for multiple production lines to operate in facilities around the world and have all aspects of the line observed in real time.

Most importantly, it is highly secure, relying on a 256-bit encryption that works in concert with a customer’s internal firewall, keeping all data blocked from standard network traffic. And all Elementary’s systems are hardwired for enhanced security from camera to computer, eliminating troublesome data transmission problems resulting from the use of WiFi. In fact, as an added level of data protection, each client has their own dedicated, secure cloud storage, which eliminates the chance of data becoming intermingled.