

Carousel inspection transformed by VIDEO SYSTEMS's AI-driven Oculus

Redefining performance standards in check detection, VIDEO SYSTEMS's Imago® Oculus 5th Gen is now revolutionizing carousel inspection thanks to its AI-driven capabilities. This cutting-edge system offers such advanced features as enhanced video speed, ergonomic design and AI-powered image analysis. Indeed Oculus's new rack design, edge computing and seamless integration all make it an essential tool for modern quality control processes.



AI AT THE EDGE OF CAROUSEL INSPECTION SYSTEMS

The latest iteration of the Oculus system, now in its fifth generation, has dramatically redefined the performance capabilities of carousel inspection systems. Any previous benchmarks or comparisons are now obsolete, as the introduction of artificial intelligence (AI) has significantly elevated what the system can achieve. Over the past 18 years, Oculus has established itself as a pioneer in the detection of checks on carousel machines. Today, with the introduction of the fifth-generation model, a new standard has been set

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for the industry. For Video Systems, this is not an endpoint but a new starting line - poised for future innovations that will further meet the ever-growing demands of the market. The enhanced functionality and power of Oculus now make it an excellent tool in modern quality control processes. Historically, detecting checks on carousel machines was a laborious and complex task, often involving outdated methods that contributed to significant production downtimes. Drawing upon over

three decades of expertise in non-contact vision technology, Video Systems introduced the Imago® Oculus solution in 2007. Since then, the system has evolved through five generations, serving as a testament to the company's commitment to innovation. With a standard configuration of eight cameras and endless upgrade possibilities, Oculus provides comprehensive check detection for every component of the container. Collaborative partnerships with end-users and machine build-

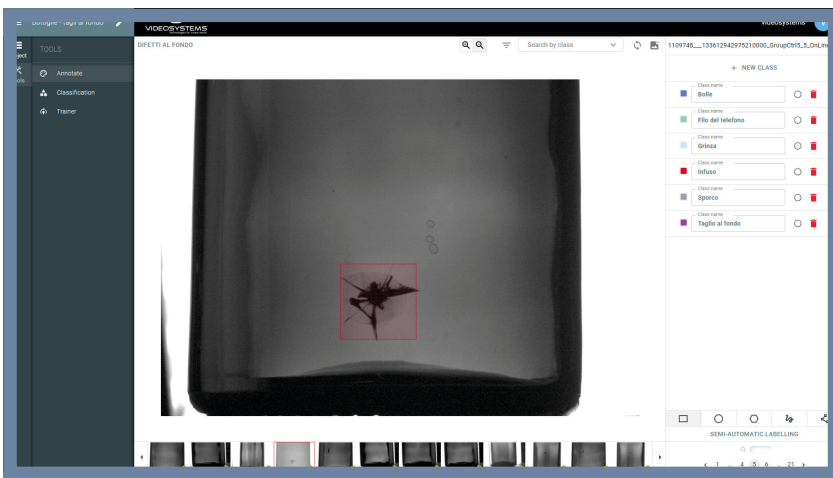
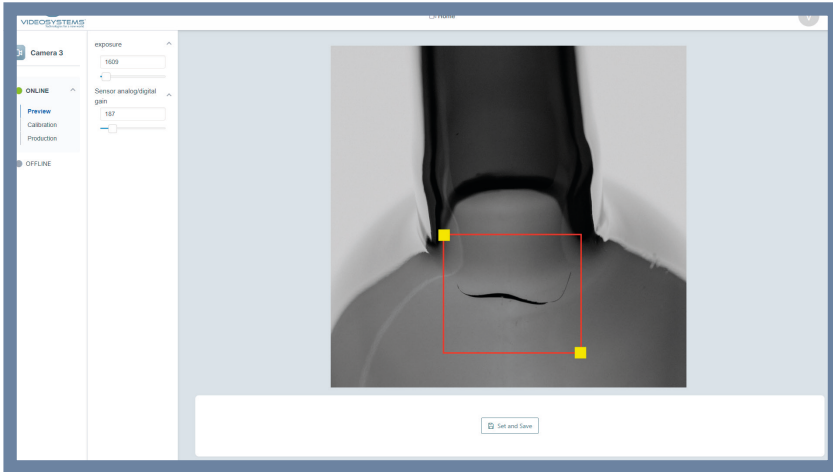
ers have played a key role in refining the system, ensuring seamless integration with carousel machines of any make or vintage. Today, the system undergoes stringent testing across all carousel machine generations, allowing customers to elevate their quality inspection processes with ease.

THE 5TH GEN: NEW CAPABILITIES UNVEILED

The fifth generation of Oculus has been completely re-engineered, introducing a host of notable improvements. These include:

- A 25 percent reduction in camera size, making the system more ergonomically friendly for use on inspection machines.
- A 50 percent increase in video speed, with the adoption of automotive-grade standards for video signal transmission.
- Enhanced camera data monitoring for hardware functionality, ensuring real-time detection of any camera malfunctions.
- The use of video cables exceeding 20 metres in length.
- A new smart lighting module.

The system's computing power



has been significantly upgraded, enabling advanced functionalities such as the ability to save images of inspected containers. Users can review results and reprocess saved images offline, offering a level of flexibility that is crucial for continuous quality improvement. Most notably, Oculus is now equipped with AI engines, similar to those used in Video Systems's other high-performance systems like Omnia, Extrema and Linea, which have been in development over the past 20 years. With this update, the entire Imago portfolio is now powered by one or more AI systems, making Oculus a cutting-edge solution in the realm of optical quality control and inspection.

DESIGN ROOTED IN CUSTOMER FEEDBACK

The Oculus rack has been redesigned to meet the needs of the mar-

ket, particularly those of end-users and carousel machine manufacturers. The new rack is as compact as possible whilst remaining expandable - allowing for multiple racks to be stacked upon the same machine. The insertion and extraction process for the Ingenium® processing units has been simplified, improving overall ease of use. In addition, the unit now integrates control for the lighting system, thereby enhancing system functionality. The cameras have also been reduced in size and their design optimized for user-friendliness. All components feature a sliding system, making it easy to insert and remove parts, simplifying replacements in the event of malfunctions.

SMARTER THAN EVER

With the integration of AI, the Oculus system has become smarter, making machine setup simpler and

significantly improving defect detection while reducing false rejects. Video Systems has harnessed 20 years of AI experience, beginning in 2001, to power the system with GPUs that enable edge-based AI processing. The same models developed for more complex systems, such as Omnia (for sidewall analysis) and Linea (for contactless crack shoulder detection), have been integrated into Oculus. The system operates with both reflection-based imaging and backlit image acquisition, using diffused intelligent lighting modules. It is further supported by the Ingenium® VSAi platform, which handles image annotation, training and AI model optimization. Ingenium® VSAi can be offered as a SaaS cloud service or deployed on-site at customer facilities - offering flexibility and scalability.

This integration of AI brings the latest advancements in inspection technology to Oculus - significantly boosting its performance in quality control.

A REDESIGNED USER EXPERIENCE

The user interface of the Oculus system has been redesigned to integrate the latest functionalities and improve user experience - based largely upon customer feedback. The new interface features a summary page where all eight cameras can be viewed simultaneously - along with real-time production statistics. Users can select individual cameras to adjust parameters both online and offline, allowing for the fine-tuning of analysis settings by reprocessing saved images. Once ideal parameters are identified, they can be applied for real-time analysis. Users also have the ability to review the most recently inspected bottles and defects. Moreover, the interface for defining inspection zones has been significantly improved, providing greater control. The system's AI-powered image analysis connects seamlessly with the Ingenium® VSAi platform, allowing users to

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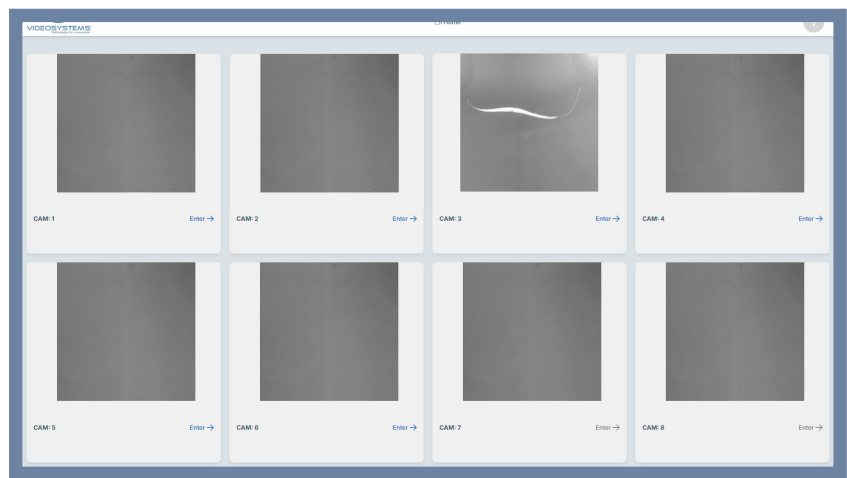
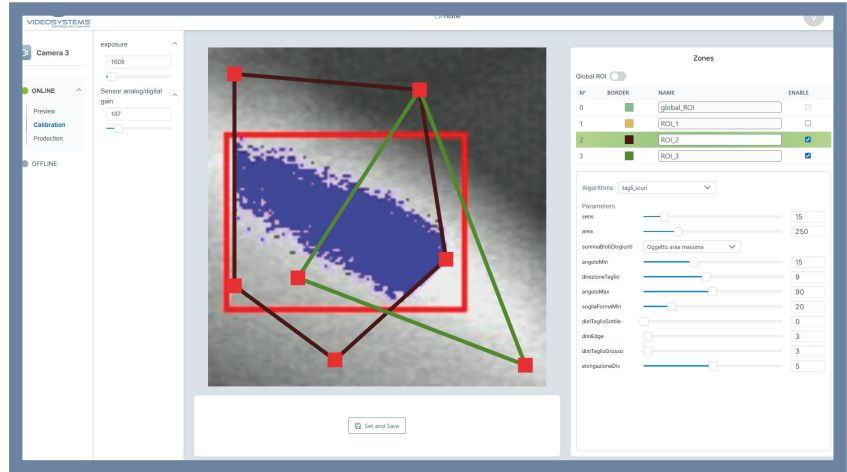
train, compare and optimize AI models for peak performance.

A SOLUTION WITH UNIVERSAL APPEAL

Oculus is designed with robust connectivity and interoperability - making it an ideal fit for a wide range of industrial environments. Equipped with a digital I/O interface and various adapters, the system can be connected directly to any carousel machine on the market, whether it's a brand-new model or a much older, legacy version. This ensures the Oculus system is suitable for both new installations and retrofitting existing equipment, - offering cost-effective upgrades to state-of-the-art visual inspection technology. The system also supports plant connectivity via a gigabit Ethernet interface, compatible with standard communication protocols such as TCP/IP, UDP and IIoT standards like MQTT and AMQP. For automation integration, Oculus supports MODBUS/IP and OPC-UA protocols. Additional features include an HDMI output for video display, two USB ports for keyboard and mouse connectivity and an optional WiFi interface. These capabilities make the fifth-generation Oculus system a comprehensive solution for optical quality control on carousel machines.

A RESILIENT, MULTI-BRAIN DISTRIBUTED SYSTEM

Oculus is an edge-computing system, where each camera is equipped with its own processing unit. This decentralized design is a strategic choice by Video Systems to ensure greater resilience and superior performance compared to centralized systems. In traditional centralized setups, the failure of the main PC could bring the entire system to a halt. With Oculus, if an individual processing unit fails, only the camera linked to that unit is affected, while the rest of the system continues to



operate. Additionally, replacing a faulty processing unit is quick and straightforward. The system has been engineered to handle both current and future camera functionalities, allowing the system to scale automatically without the need to replace a central PC, as is often required with centralized systems. This architecture makes Oculus a more robust, efficient and future-proof solution.

MORE THAN JUST A CRACK INSPECTOR

The fifth-generation Oculus goes far beyond simple crack detection. It represents a significant leap forward in industrial vision technology. Powered by advanced AI engines, the system can classify and identify a wide range of defects, extending well beyond surface imperfections. With specialized software packages, the

system can perform tasks such as dot code decoding, alphanumeric mold number reading, and custom inspection functions, all integrated into the new GPU processing system. In essence, the fifth-generation Oculus is a fully-fledged edge vision system designed to meet the most demanding requirements, offering unparalleled accuracy and flexibility in defect detection and classification. ■



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VIDEO SYSTEMS

Viale Mangiarotti, 4
33033 - Codroipo - UD - ITALY
Tel.: +39-0432-913582
E-mail: sales@videosystems.it
www.videosystems.it