Automating Manufacturing Processes and Optimizing Quality Assurance with Bravent's Industrial Vision Solution

Bravent's Industrial Vision Solution, powered by Intel® processors and optimized with the Intel® Distribution of OpenVINO™ toolkit, empowers businesses to streamline quality assurance operations, accelerate production output, and exceed customer expectations.

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About Bravent

Bravent is an innovative digital transformation consultancy specializing in AI-driven solutions tailored to meet the evolving needs of modern manufacturing. Founded in 2013, Bravent has rapidly grown into a team of over 150 professionals with specialized expertise in the modernization of web applications. With proven expertise in Artificial Intelligence & Machine Learning, Bravent leverages the latest developments in technology to deliver exceptional and reliable results for their clients. Headquartered in Spain and branched in the U.S, Mexico, Qatar, and Peru, they stand at the forefront of transformative solutions. By redefining traditional quality assurance methods and harnessing the power of image-based automation, Bravent's Industrial Vision Solution (BIVS) enables manufacturers to enhance their production efficiency, ensure product quality, protect workplace safety, and stay ahead of the competition.

The Imperative for Modern Manufacturing Solutions

Manufacturers today find themselves navigating a difficult landscape, contending with rising production costs, shipping and supply chain complexities, and rapidly changing customer expectations. Machinery downtime and delayed operations on the factory floor can significantly impact a manufacturer's bottom line. These challenges underscore the need for a delicate balance between maintaining quality standards and maximizing efficiency.

Reliance on outdated methods for quality assurance further compound modern manufacturing challenges:

- **Poor product quality:** These methods often result in faulty quality assessment, where defects and anomalies may go undetected and compromise product quality.

- **Production inefficiency:** Manual or inefficient inspection processes contribute to increased costs and deplete valuable time and resources. Limited data insights provided by these methods also hinder the ability to identify trends, optimize processes, and innovate, consequently diminishing overall business growth and competitiveness in the manufacturing landscape.

- **Worker safety risks:** On the factory floor, manual control of working conditions may overlook substantial hazards to in-line personnel, potentially compromising their well-being and workplace safety.

To remain competitive in today's commercial market, it is vital that businesses modernize their quality assurance processes to maintain high production output and optimize the performance and safety of in-line personnel. Enter Bravent's Industrial Vision Solution, a comprehensive industry solution tailored to meet the evolving needs of modern manufacturing. IT consultancy Bravent developed an agile, scalable AI-based computer vision solution to correct the frequency of human error in machinery assemblies.

The decision to integrate an advanced AI quality inspection solution presents a pivotal opportunity for manufacturers to transform their quality assurance practices, streamline operations, prioritize workplace safety, and bring superior products to market, all while preserving valuable time and resources. By delivering exceptional products that redefine industry standards for quality and reliability, Bravent's Industrial Vision Solution helps cultivate customer loyalty and trust. Employing innovative approaches and leveraging the capabilities of AI grants Bravent customers a competitive edge in the industrial sector by proactively addressing quality assurance issues before they escalate.

Bravent's Industrial Vision Solution: Optimizing Production Output with an AI-Powered Quality Inspection System

In response to growing market demand and global trends in AI adoption, Bravent identified a need for integrated AI-powered computer vision (CV) solutions across various sectors, notably manufacturing. Many businesses sought to streamline pipelines and address challenges in quality assurance processes amidst variable market conditions. Recognizing this opportunity, Bravent directed their efforts to secure more efficient methods for training their AI models. By harnessing the power of AI driven insights, Bravent's Industrial Vision Solution offers users visibility into the full scope of their operations.

Bravent's Industrial Vision Solution works by combining AI and machine learning algorithms with live video and vision, amplifying the ability to analyze activities on the factory floor and respond in real-time.

Some KPI's:

- ☐ Initial reduction of **8%** in processing times

- ☐ **70-80%** reduction in errors and assembly failures, which are not transferred, moreover, to the end customer

- ☐ **98%** reduction in model training time

- ☐ **30%** reduction in image tagging time

With its cutting-edge approach to quality assurance monitoring, the Industrial Vision Solution creates multi-sense, multi-device experiences through algorithms that can be implemented either in the cloud or directly on the devices, tailored to suit a company's specific needs. The vast amount of data generated by the industrial sector is harnessed and provides a special opportunity for leveraging analytics that can improve factory performance at many levels of the chain.

Furthermore, Bravent's Industrial Vision Solution assists companies with predictive maintenance of production equipment, thereby improving equipment maintenance strategies and spare parts procurement cycles as well as associated inventory management. Powered by real-time data analysis, anomaly detection, and automatic learning capabilities, this solution empowers manufacturing enterprises to optimize their processes, ensure product quality, and deliver exceptional customer experiences.

Key Features

Anomaly Detection: The solution identifies deviations from quality standards, allowing manufacturers to detect and rectify issues before they impact production targets or customer satisfaction.

Real-Time Data Analysis: Bravent's Industrial Vision Solution provides manufacturers with the ability to monitor their operations in real time, enabling quick decision-making and proactive intervention to address quality issues as they arise.

Speed and Automatic Learning: With rapid data processing capabilities and automatic learning algorithms, Bravent's Industrial Vision Solution continuously improves its performance over time, adapting to changing production environments and evolving customer demands.

Seamless Integration and Customization: Bravent's Industrial Vision Solution is designed to seamlessly integrate with existing systems and services, such as ERP or other manufacturing software. This ensures smooth implementation and minimal disruption to existing workflows.

Effortless Capability Expansion: Adding new or updating existing capabilities is effortless with the Industrial Vision Solution, allowing for easy deployment of new AI models or analysis methods, empowering manufacturers to stay ahead of the curve and adapt to emerging challenges.

Bravent's customers receive the necessary cameras, embedded hardware, and any other device required to deploy the solution seamlessly. Customers are only required to provide a few images for labeling and training of the AI model, after which the installation process follows. The deployment model contributes to positive customer feedback, in part because of the seamless capability and feature updates that Bravent can provide to align with evolving business needs.

End Customer Benefits

Enhance Manufacturing Processes and Business Outcomes: Bravent's solution empowers manufacturers to optimize their operational performance through data-driven, real-time insights. By harnessing the power of AI technology, Bravent's Industrial Vision Solution enables businesses to detect and rectify quality assurance issues before they impact production or customer satisfaction. This ensures that companies deliver reliable, high-quality products to end-users, ultimately fostering brand loyalty. Through the enormous amount of data collected by this AI—powered computer vision solution, companies also gain a holistic overview of processes on the factory floor and the opportunity to identify strengths, weaknesses, and areas for improvement. Remote monitoring allows companies to assess the condition and productivity of individual assets as well as entire factory floors while also gathering accurate insights at their fingertips.

Increased Productivity and Cost Optimization: Companies can experience a substantial increase in productivity with this solution. By automating processes that previously required human supervision, employees can focus on more value-added tasks, leading to greater efficiency and cost optimization. Additionally, the solution's ability to improve product quality translates into cost savings by reducing rework. By delving into performance metrics, manufacturers can refine processes and optimize resource allocation seamlessly.

Improved Safety and Immediate Validation Results: With Bravent's Industrial Vision Solution, companies can rest assured knowing that safety is a top priority. The solution's advanced algorithms can detect and prevent potential hazards, ensuring a safe working environment for employees. Moreover, the immediate presentation of validation results without delays in the production chain enhances operational efficiency and minimizes downtime.

Customer Success Story: Agricultural Equipment Assembly Process

Challenge

The extensive assembly process of a leading tractor manufacturer involved an intricate manual assembly line requiring precise part placement and sequence. With this approach, a single mechanic or operator had to complete over 40 steps, assembling more than 90 parts in approximately 2 hours, and was required to repeat this process at least four times a day with no room for errors. Due to evolving capability needs, the customer's quality assurance department sought an automated solution to enhance efficiency and prevent human errors. It was essential for management to address any prior deviations from set parameters and impose secure corrective actions through automated monitoring.

Solution

The leading tractor manufacturer recruited the help of Bravent to launch AI-powered computer vision quality assurance measures which require less time and manpower for the tractor assembly process. Understanding the need for advanced technology and expertise given the size of its manual assembly line, the customer sought Bravent's Industrial Vision Solution to ensure a seamless optimization of their assembly operations. By harnessing Machine Learning and Deep Learning algorithms, the customer adeptly analyzed visual images and extracted crucial insights to inform decision-making. Bravent's Industrial Vision Solution enabled their tractors to take a significant stride forward in their assembly operations by quickly detecting and eliminating potential assembly mistakes.

Results

Equipped with an advanced, specialized solution, the prominent tractor manufacturer gained assurance that their tractors will consistently meet the requisite quality standards, ensuring uninterrupted assembly processes and lasting customer trust. Bravent's integration approach allows the business to autonomously manage the solution, eliminating the need for training AI models or sourcing data scientists. As a result, the business gained a scalable solution that adapts alongside their evolving business needs, maximizing their ROI and sustaining manufacturing excellence.

Intel® Technology Optimizes Bravent's Industrial Vision Solution Software

At the core of Bravent's Industrial Vision Solution is cutting-edge image recognition technology, powered and optimized with leading Intel® technologies. Intel® Core™ processors provide enhanced compute capabilities, while the Intel® Geti™ platform and the Intel® Distribution of OpenVINO™ toolkit play a pivotal role in optimizing Bravent's Industrial Vision Solution development and deployment process, resulting in reduced costs and expedited time to market. Beyond utilizing superior hardware and inference and model training software, Bravent's collaboration with Intel is a testament to the innovation fostered between the two teams.

Intel® Core™ Processors: Incorporating Intel technology into Bravent's Industrial Vision Solution not only boosted performance and efficiency but also ensured compatibility and scalability. The integration of Intel® Core™ Processors facilitated real-time inferencing both on-premises and at the edge, enhancing Bravent's Industrial Vision Solution' adaptability across various computing environments and providing consistent performance.

The Intel® Geti Platform: For digital transformation experts and data scientists, a major challenge lies in the time, human effort, and computational resources needed to train AI for new capabilities. Creating machine learning solutions that are both accurate and scalable requires a faster and adaptable deployment process. This is precisely where the Intel Geti platform becomes critical.

To replace high-cost and time-consuming manual quality assurance processes, computer vision models require specific labeling for each one of the images used in their training. A number of images are necessary to develop a solution that meets the needs of a company's unique factory assembly process. The platform Bravent originally employed to conduct image labeling and model training was lacking in speed. Bravent's participation in the Intel Geti platform Early Access Program granted them access to a powerful server and graphics card for on-premises computer vision model training, along with a tablet to streamline image labeling. Through the partnership with Intel, Bravent was able to conduct edge-based image analysis that reached speed approaching 30 frames per second (fps).[1] The Intel Geti interactive AI platform significantly reduced annotation tasks and accelerated Bravent's model learning process.
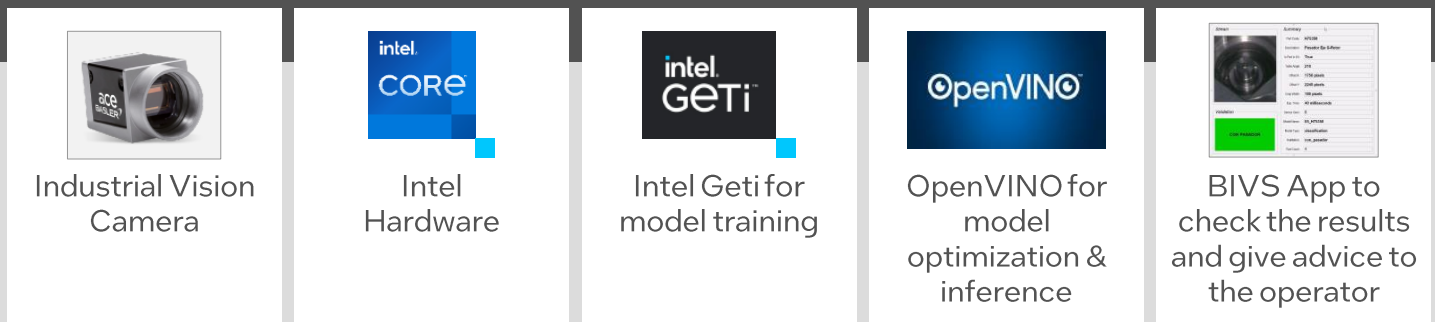
Intel® Distribution of OpenVINO™ Toolkit

Intel® Distribution of OpenVINO™ toolkit provides a full suite of development and deployment tools. Through the toolkit, Bravent's model architecture was finely tuned for edge inference. In the quality assurance process, a camera is positioned at a specific location within a work cell to capture machinery assembly. Then, the recorded images are analyzed using pre-trained models to ensure adequate assembly, while the application is tasked with verifying the presence of all necessary parts, guaranteeing correct part usage and adherence to specific assembly steps. Additionally, the toolkit's model zoo has been pivotal in the deployment process, facilitating swift prototyping and validation of concepts. By accessing various pre-trained models and architectures, Bravent expedited iterations, minimizing development timeless and fostering innovation. Subsequently, Bravent's Industrial Vision Solution integrates with a factory's quality control department's applications, and this integration produces valuable insights that inform a company's decision-making process.

By optimizing their solution with the Intel Distribution of OpenVINO™ toolkit, Bravent fine-tuned their models for edge computing and to deliver real-time insights directly to the factory floor, bypassing the need for data transmission or cloud processing.

The Bravent and Intel collaboration proved instrumental in successfully optimizing models for real-time use on multiple devices while remaining close to the data source at the edge. With the strategic integration of Intel® technologies, Bravent's Industrial Vision Solution is not only enhanced but fortified. Together, Bravent and Intel have developed a robust computer vision framework, making Bravent's Industrial Vision Solution resilient to a myriad of challenges and scenarios. This collaboration ensures that Bravent's Industrial Vision Solution is both adaptable and reliable in its performance.

Bravent's Industrial Vision Solution

Industrial Vision Camera	Intel Hardware	Intel Geti for model training	OpenVINO for model optimization & inference	BIVS App to check the results and give advice to the operator

Conclusion

Bravent's Industrial Vision Solution represents an opportunity for customers in the industrial sector to improve productivity, streamline processes, preserve time and resources, reduce operating costs, and maintain workplace safety compliance. Through the integration of the Intel® Geti™ platform, the Intel® Distribution of OpenVINO™ toolkit, and Intel® Core™ Processors, Bravent can reliably accelerate model development and expedite their release to market, providing Bravent's Industrial Vision Solution customers with cutting edge features at a better price point and with increased performance. Bravent's Industrial Vision Solution prioritizes scalability without compromising the effectiveness of quality assurance monitoring, providing customers with a seamless experience that equips them to confidently navigate the complexities of modern manufacturing. For more information on how Bravent's Industrial Vision Solution can benefit your business, explore the Bravent solution page for updates and guidance on getting started.

Learn More

To learn more about Bravent visit:

- [Bravent Website](#)
- [Bravent Industrial Vision Solution Page](#)
- [Bravent and Intel® Geti™ platform Case Study](#)
- [Bravent and John Deere Customer Success Story](#)

To learn about Intel® technologies visit:

- [Intel® Distribution of OpenVINO™ Toolkit Product Page](#)
- [Model Zoo for Intel® Architecture Product Page](#)
- [Intel® Atom Processor Product Page](#)
- [Intel® Core™ Processors Product Page](#)
- [The Intel® Geti™ Platform Product Page](#)

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With Intel technologies and capabilities, a vendor's optimized offering can go beyond the traditional compute and extend to accelerated networking, storage, edge, and cloud. It's all part of helping customers build an optimized infrastructure across the company.

Sources

1. [Bravent Creates Agile, Scalable Industrial Vision Solutions with the Intel® Geti™ Platform and OpenVINO™ Toolkit,](#) Intel® Geti™, 2022

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