Solution Brief

Simplify Seaport Traffic Management with Intel and Gamma Solution Sdn. Bhd.

AI-optimized platforms and traffic management systems at seaports can enhance the efficiency, safety, and adaptability of operations. But having the right partner for these platforms is critical.

Key Takeaways

1. AI-driven traffic management solutions at seaports offer real-time insights and predictive planning capabilities that optimize traffic management.
2. Implementation of AI-enabled solutions at seaports brings operational efficiency by addressing the unique challenges inherent in maritime environments.
3. Strategic partnerships between technology providers and solution developers drive innovation in traffic management, ensuring scalability and adaptability to diverse industry needs.

Summary

In today's rapidly evolving world, effective traffic management at seaports is crucial in ensuring efficiency and safety for an uninterrupted flow of operations. By harnessing cutting-edge technologies such as AI and IoT, the solution offers real-time issue identification, predictive planning, and optimized resource allocation, tailored specifically for high-traffic seaports.

Its implementation ensures an efficient, future-ready approach to traffic management, addressing unique operational challenges. Collaborations with strategic partners drive further value to stakeholders across the value chain and usher in an integrated and intelligent digital future of seaports.

Even though challenges persist in this journey, the integration of AI in seaport management is paving the way for a faster, more efficient, and more responsive future.

The Need for Bringing Seaport Management into the 21st Century

Initially limited by hardware capabilities, visual inspection solutions have evolved with IoT to handle complex workloads efficiently by leveraging enhanced data connectivity and analytics.

Augmenting IoT systems with AI technologies such as machine learning and deep learning enhances these systems' capabilities, enabling them to learn from data, improve continuously, and make intelligent decisions swiftly.

For instance, AI-powered defect detection can better identify and predict defects from past data, drastically reducing waste and improving product quality, while AI-enhanced Optical Character Recognition (OCR) systems adapt to various fonts and conditions, significantly boosting text recognition accuracy.

This synergy of AI at the edge only makes these functions more streamlined and scalable but also aligns them with the evolving needs of modern industries such as agility, scalability and enhanced output.

Marine infrastructure has served as a hub for innovation since the times when the earliest mariners congregated to trade spices and grains. Today's maritime industry has seen advancements at sea as well as on land, by developing technologies and a host of primary drivers. Despite the invention of the automobile (1886) and airplane (1903), around 90% of all globally traded goods are transported over the ocean[1], and shipping ports continue to handle 70% of all merchandise[2]. This makes it critical for seaports to adopt an integrated, 'technology-first' approach to community and traffic management. Digital transformation is the key to optimizing operational efficiency, conserving resources, identifying critical events, minimizing disruptions and sustaining round-the-clock operations.

This transformation encompasses the integration of AI, computer vision, and IoT technologies into seaport management and provides a robust toolkit for analyzing, detecting, and predicting patterns in real-time traffic and operational data within seaport environments. AI models, specifically designed for seaport traffic flow prediction, harness historical and real-time data to discern intricate patterns and trends. Predictive analysis empowers port authorities to anticipate future conditions, optimize resource allocation, fine-tune route optimization to mitigate congestion, and proactively adjust traffic signal timings. Furthermore, AI's capabilities extend to incident detection and management, rapidly identifying issues such as vessel incidents, equipment malfunctions, or cargo blockages. This information not only facilitates swift responses but also aids in supplementary actions, such as rerouting traffic within the port.

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Navigating the Challenges of Community and Traffic Management at Seaports

A primary hurdle to AI-enabled community and traffic management at seaports arises in efficiently handling vast quantities of video data. The volume of foot and vehicular traffic combined with multiple points of entry and exit translates into equally large volumes of video data from multiple data streams. This level of complexity necessitates sophisticated analytics to derive meaningful insights, presenting a challenge in terms of data processing speed and efficiency within the dynamic and complex seaport landscape.

An additional challenge is associated with the inherent lead time in video analytics. The time lapse between data capture and analysis can significantly impact the system's responsiveness, particularly in seaport scenarios where swift decision-making is crucial for ensuring operational efficiency and security. Recognizing the critical importance of minimizing this lead time, Gamma Solution Sdn. Bhd. is dedicated to enhancing the real-time effectiveness of traffic management solutions within the unique challenges posed by seaport environments.

These challenges necessitate a scalable solution that simplifies the intricacies of AI-enabled community and traffic management at seaports. The focus is on refining data processing capabilities, improving lead times for insights and alerts, and creating scalable solutions for seaport-wide monitoring. An AI-enabled solution, leveraging Intel technologies aims to establish new standards in the realm of seaport community and traffic management. This strategic alignment addresses the unique challenges presented by seaport environments, contributing to a more efficient, secure, and responsive traffic management landscape in these specialized settings.

The Titanus EYEoT Solution

Titanus EYEoT, a comprehensive AI video monitoring solution, has been developed by Gamma Solution Sdn. Bhd. in collaboration with Intel to meet the evolving demands of traffic management systems. When deployed at seaports, this end-to-end solution integrates video monitoring, real-time AI video analysis, and scalable storage options, tailoring its capabilities to unique requirements and challenges. The solution merges Intel's hardware and software tools such as CPUs and Intel® Distribution of OpenVINO™ Toolkit for streamlined AI video analysis. The solution's versatility is further highlighted by its adaptability to different customer needs, offering functionalities such as vehicle and human behavior detection, license plate recognition and more.

The technological backbone comprises Intel® Core™ processors from 11th Gen to 13th Gen, chosen for their performance on workloads such as AI inferencing, Video Management and Monitoring. The processors include:

- Intel® Core™ i5-1145G7E
- Intel® Core™ i7-1185G7E
- Intel® Core™ i7-11700
- Intel® Core™ i9-11900
- Intel® Core™ i7-12700
- Intel® Core™ i7-13700

The deployment leverages Intel Distribution of OpenVINO Toolkit optimizing AI inference for various applications like License Plate Recognition (LPR), Access Control, Traffic Behavior Analysis, and Human Behavior Analysis. This solution architecture, centered around Intel's hardware and software, delivers both flexibility and efficiency at scale. Furthermore, AI suite for Visual Analytics and edge AI servers, including the Video Management Server and AI Video Central Monitoring System, establishes a robust foundation for intelligent traffic management.

EYEoT in Action

The integration of Intel's OpenVINO-optimized AI inference has significantly expedited the deployment of Titanus EYEoT in real-world scenarios. Which in turn has enhanced the accuracy and speed of vehicle-behavior detection across various locations with distinct vision angles. This not only showcases the efficiency of AI inference but also highlights the adaptability of the solution to diverse environments.

The holistic nature of Titanus EYEoT, encompassing both hardware and software elements, underscores its capability to offer end-to-end coverage from edge sensors to backend platforms. This approach, coupled with the flexibility for system integration based on customer requests, positions Titanus EYEoT as a tailored solution that addresses the needs of different segments and scenarios.

The implementation of Titanus EYEoT has demonstrated tangible improvements in traffic control efficiency, particularly in seaport environments. The AI inference embedded in the solution plays a pivotal role in detecting various vehicle behaviors, generating timely alerts, and ensuring swift responses from enforcement and patrol teams. This has led to a remarkable reduction in vehicle violation incidents at the seaport, dropping from an approximate count of 200 per month to less than 50 per month[3] after the deployment of the Titanus EYEoT solution.

Future Applications of Titanus EYEoT at Seaports

The scope of Titanus EYEoT can be expanded to address additional challenges in seaport environments. The next phase of development could potentially extend to the analysis of seaport workers specifically targeting behaviors such as smoking and suspicious activities, through a network of AI-enabled edge devices such as smart CCTV cameras. This forward-looking initiative aims to further optimize operations, ensuring a more comprehensive understanding of the dynamics within seaport facilities.

To achieve these ambitious goals, Intel Distribution of OpenVINO Toolkit is crucial. It optimizes deep learning models enabling faster inference for enhanced decision making. The utilization of this toolkit will play a crucial role in refining and enhancing AI inference, ensuring they meet the evolving requirements of seaport management and security.

Furthermore, 13th Gen Intel Core Processors, are being evaluated to drive the next iteration of this solution. The enhanced capabilities of these processors are expected to elevate the performance and functionality of Titanus EYEoT, enabling it to tackle even more complex scenarios and deliver heightened efficiency in community and traffic management. This strategic alignment with cutting-edge Intel technologies positions Titanus EYEoT as a forward-looking solution ready to adapt and evolve in response to the dynamic landscape of smart community and traffic management.

About Gamma Solution Sdn. Bhd.:

Gamma Solution Sdn. Bhd. is an importer, distributor and CCTV solutions provider with an emphasis on serving security system companies, government bodies, and organizations from all over the world. Since its inception in 2000, Gamma Solution Sdn. Bhd. has cooperated with thousands of business partners and has stood strong in the belief that support and quality services are essential to be successful in this industry.

With a policy to deliver the best products, support and services to clients and partners worldwide Gamma Solution Sdn. Bhd. been awarded by one of the leading DVR surveillance system makers in the world, GeoVision, as their Sole Distributor in Malaysia and Brunei since 2002. Gamma Solution Sdn. Bhd.'s corporate client base includes factories, government departments, banks, hospitals, hotels, multinational companies and financial institutions.

Learn more about Gamma Soultion Sdn. Bhd.

Sources:

[1]OECD: Ocean Shipping and Shipbuilding

[2]UN Covid19 Maritime Transport: Impact and Response Report

[3]Gamma Solution Sdn. Bhd.