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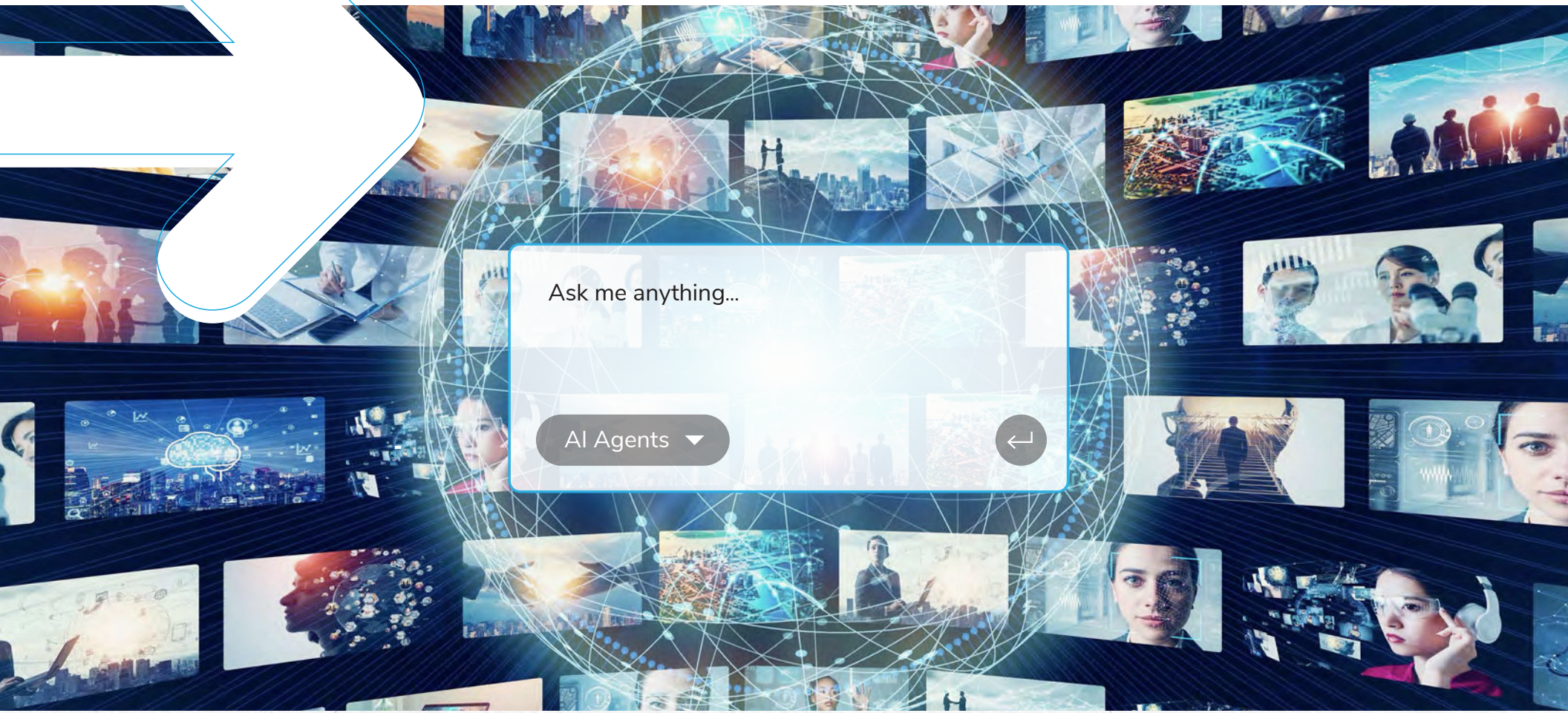

From Sight to Insight:
Disrupting Video Analytics with Agentic AI

FROST & SULLIVAN WHITEPAPER

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INTRODUCTION

Modern video systems, like enterprise-level CCTV and city-wide surveillance, have significantly improved security, safety, and operations. However, the growing volume of video data have exceeded operators' capacity to monitor and respond in real time. Operational teams typically interact with less than 1% of recorded video, leaving most of the data untapped. This unprocessed data contains hidden risks, threats, and patterns that could reveal transformative insights, but resource constraints prevent extraction.

Early video analytics enabled real-time motion detection, but their basic object recognition struggled in complex environments. With the rise of artificial intelligence (AI), Vision AI improved object recognition, classification, and tracking using machine learning and deep neural networks. Yet, Vision AI still relies on predefined models and lacks deep contextual understanding, limiting its adaptability to real-world complexity.

As video use expands, organizations recognize the broader potential of video data beyond security, unlocking insights that improve safety, compliance, efficiency, and profitability. The emergence of third generation video analytics (known as Video Intelligence), powered by generative AI and agentic AI, will accelerate adoption in sectors like critical infrastructure, public sector domains, seaport and airport operations, and traffic violation enforcement, enabling proactive decision-making and real-time optimization.

Vision AI to Video Intelligence: Future of Video Analytics

Video Intelligence enhances and transforms Video Analytics and Vision AI, turning passive video data into a powerful, actionable resource. It interprets vast unstructured data, making it usable for security, safety, compliance, operations, and strategic planning.

Understanding Video Intelligence Starts With the Technology Trends That Made It Possible:

Video Content Analytics uses computer vision to detect predefined objects, movements, locations, and activities, helping operators manage large volumes of footage by categorizing them to flag potential threats or risks. However, its rigid, rule-based design limits use cases and often leads to false alarms and missed threats, making it hard to adapt to real-world complexity or respond beyond predefined scenarios.

Vision AI, driven by advances in machine learning, deep neural networks, and AI hardware accelerators, improved object detection, classification, tracking, and scene analysis, while enabling broader use for real-time monitoring, forensic search, and historical analysis. It also supported faster deployment of new algorithms and could handle multiple tasks on a single camera. However, its reliance on predefined algorithms and focus on security limited broader industry adoption.

Video Intelligence has evolved beyond basic scene analysis, merging Vision AI with cutting-edge technologies like domain-specific video language models (VLMs), large language models (LLMs), graph databases (GraphDBs), retrieval-augmented generation (RAG), and AI agents. This convergence enables the first agentic AI video intelligence platform capable of reasoning—marking a major shift that is redefining the industry.

While Vision AI detects specific objects, domain-specific VLMs and LLMs enable operators to search complex scenarios using natural language—like “a car in a bus lane as an ambulance approaches.” This flexibility removes the need for vendor reconfiguration. Generative AI agents further streamline workflows, operating independently or via a copilot interface to enhance human-machine collaboration. Their accuracy supports critical needs in law enforcement, operational safety, production efficiency, and strategic planning across cities, seaports, and airports.

Video Intelligence: Capabilities, Uses, and Benefits

Today's operations teams are tasked with a growing list of real-time monitoring, response, mitigation duties, historical trend analysis, business and operational planning, and broad analytical activities. This creates an opportunity for a more comprehensive, flexible, and customizable video intelligence solution that can meet these evolving demands.

Video Intelligence Solutions Key Benefits Include:

UNCOVERING HIDDEN INSIGHTS: By integrating VLMs, LLMs, RAG, GraphDB, and agentic AI with Vision AI, video intelligence helps uncover hidden risks, patterns, and trends more efficiently. It reveals insights previously inaccessible, enabling better decisions, process improvements, and new opportunities—all grounded in observable video data.

PERFORMANCE EFFICIENCY: Pairing human operators with AI agents automates complex tasks and workflows, improving efficiency and effectiveness in both routine and mission-critical operations, while helping teams meet short- and long-term demands.

OPERATIONAL TRANSFORMATION: AI's emergent reasoning enables it to perform complex inferences, solving problems and generating conclusions. Whether reconstructing accidents, analyzing evidence, or planning urban improvements, reasoning-powered agents can handle complexity, weigh uncertainties, and streamline labor-intensive workflows and root-cause analysis.

UNLIMITED USE CASES: Video intelligence platforms overcome the limits of traditional analytics by enabling deep contextual understanding. With a natural language interface, operators can create new use cases without vendor updates, expanding support for security, safety, compliance, and operations.

FUTURE-READY ECOSYSTEM: Built for flexibility and scalability, video intelligence adapts to evolving operational requirements, needs, and new opportunities. It supports dynamic, self-service use cases across teams, providing lasting impact and long-term value, whether for immediate incidents or long-term strategic planning.

6 Essentials to Look for in Video Intelligence Solutions

Organizations considering video intelligence solutions should consider six key factors to ensure they select the most effective system for their operational needs.

1. **LLMs alone are not enough:** LLMs enhance video analytics by enabling natural language search over Vision AI-generated data, but an end-to-end video intelligence solution requires a broader approach to fully understand and interpret video content using VLMs and other advanced Agentic AI technologies.
2. **VLMs need Vision AI:** Solutions relying solely on VLMs can't meet accuracy or latency KPIs. Domain-specific VLMs must integrate with Vision AI to understand real-time context and deliver more accurate video insights.
3. **One type does not fit all:** While off-the-shelf VLMs and LLMs may seem convenient, they often sacrifice accuracy and struggle with real-time operations across multiple video feeds. Domain-specific models, tailored to industries like airports or seaports, provide better results.
4. **Cost-efficiency:** Open-source and commercial VLMs and LLMs offer value, but their implementation can be costly. They require high-end GPUs or AI accelerators for real-time inference on multiple cameras, so cost-conscious organizations must ensure these expenses don't outweigh the benefits of transitioning from Vision AI to video intelligence.
5. **Flexibility without compromise:** The enhanced video understanding from VLMs and LLMs should enable users to define their own events, set ad-hoc alerts, and uncover key insights via a self-service, natural language approach, ensuring adaptable monitoring and analysis.
6. **AI agents for operational efficiency:** With ready-to-go AI agents, video intelligence solutions can automate complex tasks like discovery, summarization, reporting, and investigation to reduce manual work, streamline processes, and boost efficiency.

cyVisionGPT by cynapse.ai: A Global Leader in Video Intelligence

cyVisionGPT by cynapse.ai provides all of the technological capabilities and value benefits discussed above through a single, self-service software platform that makes it simple to deploy and scale video intelligence across diverse operational needs.

Surpassing all limitations that come with predefined rules and attributes, cyVisionGPT understands video content almost like the human brain. It undertakes a comprehensive approach that considers every data point and industry-specific risk factor while seamlessly choreographing every human-machine interaction. cyVisionGPT thus empowers operators to set new standards in safety, security, compliance, and operational efficiency.

cynapse.ai copilot

While cyVisionGPT's AI agents operate independently in the background, they can be actively deployed at any moment via cynapse.ai copilot. This intuitive interface enables seamless human-machine interaction and collaboration to act as the user's close assistant, helping maximize the value and insights extracted from video data in a seamless, powerful way.

Based on the user's needs, cynapse.ai copilot agents autonomously perform complex tasks and multi-step actions.

Examples include:

- **User-defined events:** Users can configure self-service events on the fly using natural language to define event characteristics. The associated AI agent then automatically creates a fully operational event detection service for both ad hoc and ongoing use cases.
- **Discovery:** Users can search using natural language or visual queries, asking both quantitative and contextual questions, such as, "Was there loitering at Building A's carpark in the last 24 hours?" or "What was the hourly average speed on Highway 1 last week, by lane?"
- **Analysis:** Users can analyze situations by asking questions like, "Was there an increase in suspicious activities at Campus B this week compared to last?" or "What were the trends in truck-related road safety violations this month vs. last month across all highways?"
- **Summarization:** Video and event data are distilled into multi-modal reports or video clips, enabling faster investigation and decision-making.
- **Business deliverables:** AI agents can automate the generation of entire business deliverables, such as incident reports and emails.
- **Reasoning:** AI agents apply human-like reasoning to complex scenarios, such as analyzing the root causes of a fight or investigating traffic slowdowns. They break down tasks into intelligent steps, coordinating AI agents to autonomously investigate, correlate, and provide actionable insights.

cyVisionGPT delivers powerful video intelligence that meets the complex security, safety, operational, and compliance demands of high-fidelity industries, from airports and seaports to major cities, road operations, correctional institutions, and beyond. As shown in the case studies below, users in these mission-critical verticals require analytics that are not only highly accurate but also fully cognizant of operational context. This standard of excellence positions cyVisionGPT to empower safer, more secure and higher-performing organizations.

CASE STUDY #1

Transforming Safety, Security, and Efficiency at One of the World's Busiest Ports

CUSTOMER

This customer is one of the world's largest seaport operators and manages one of the busiest and most complex maritime hubs. The seaport environment encompasses the following operational infrastructure:

- 20M+ annual twenty-foot equivalent unit (TEU)
- 2,000+ cameras dedicated to security
- 25+ berths
- 750+ cameras focused on safety

CHALLENGES

- **Safety incidents at the terminal:** There were various common accidents involving workers and equipment, leading to injuries and damage to assets.
- **Road safety within the port:** Frequent safety incidents occurred due to heavy vehicles speeding, blocking roads, and driving in the wrong lanes, creating hazards for both personnel and cargo.
- **Security threats:** Serious risks are posed by incidents such as unauthorized access and exit to/from the port, unauthorized removal of goods from the port, and illicit entry into restricted areas.
- **Operational visibility:** There is a lack of data-driven insights to track the usage, throughput, and productivity of workers, equipment (such as quay and RTG cranes), and vehicles (such as trucks).

THE SOLUTION: cynapse.ai cyPort

The operators decided to deploy cyPort, a powerful verticalized agentic AI video intelligence suite powered by NVIDIA AI Accelerators that is capable of scaling across the port's thousands of cameras and different use cases.

cyPort collects data from the existing security cameras positioned across the perimeter, gates, yards, and key buildings. The solution also integrated cameras focused on safety and operations, such as those mounted on quay cranes, RTG cranes, port roads, and worker platforms.

USER-DEFINED ALERTS

Operators were able to create ad-hoc alerts, such as "notify me when the turnaround time of a truck from company A exceeds 45 minutes" or "alert if no supervisor is present for over 15 minutes during a lashing activity."

AI AGENTS

Users automatically generate summaries of incidents (e.g., safety events in Terminal 1 or traffic violations on port roads). Operators can also ask complex questions like, "What was the total number of containers received at Wharf 1 and Wharf 2 last week, and what was the daily average?"

RESULTS

- 40% Decrease in Annual Safety Incidents: With continuous monitoring, user-defined alerts, and proactive responses, safety incidents have been significantly reduced.
- Improved Operational Efficiency: Automated tracking, throughput analysis, and productivity metrics across teams and equipment achieved key optimization initiatives.
- Enhanced Perimeter Security and Access Control: The system automatically detects and flags suspicious activity near fences and triggers alerts in real time. The solution can also detect potential unauthorized entry/exit of people and vehicles around restricted areas, helping prevent breaches.

Through cyPort, this global port operator has transformed its safety, security, and operational efficiency. The ability to self-define events, deploy multiple AI agents, and automate complex analysis have provided measurable improvements that demonstrate how video intelligence can support even the most demanding environments.

CASE STUDY #2

Real-Time Insights, Real-World Impact: A New Era in Traffic Management

CUSTOMER

A national road transportation authority was tasked with the planning, construction, and operation of a cosmopolitan city's extensive land transport infrastructure. Existing operational parameters included:

- 250+ junctions
- 2,000+ road and highway cameras
- 1,000+ lane-km of roads
- 500+ junction cameras

CHALLENGES

- **Road safety offenses:** There was a lack of efficiency and scalability in the detection, verification, and enforcement of key traffic violations.
- **Traffic analysis at junctions:** Key intersections required continuous monitoring to analyze traffic patterns, queue length, wait times, average speed, and vehicle count and to detect violations and traffic anomalies.
- **Outdated operational processes:** Manual data collection and a reactive approach to business planning and operational decision-making limited the long-term effectiveness of current policies.

THE SOLUTION: cynapse.ai cyRoad

The authority deployed cyRoad to improve road safety and optimize traffic flow across one of the most densely populated urban areas in the region.

AUTOMATED VIOLATION DETECTION

This enables the automatic identification of various traffic offenses, including illegal parking/stopping, illegal turn/U-turns, and speeding. Each offense is automatically turned into a violation case, vetted by an officer, and flagged for enforcement, streamlining the entire end-to-end process.

USER-DEFINED EVENTS

This allows officials to create ad-hoc rules for detecting risky or abnormal traffic behaviors in specific zones and/or during certain time windows.

TRAFFIC INTELLIGENCE AT JUNCTIONS

The cyRoad solution provides continuous analytics, such as lane-specific vehicle counts, average wait times, speed metrics, queue length, and source-to-destination lane flow mapping.

RESULTS

- Faster, more accurate enforcement: By reducing the manual burden of identifying and processing traffic violations, operations teams significantly reduced their manual workload and improved their overall incident response.
- Improved real-time monitoring: Through live traffic analysis and holistic video understanding, cyRoad can flag anomalies and discover events of interest.
- Data-driven traffic planning: Using cyRoad's up-to-date, granular traffic insights, operations teams can create dynamic, optimized plans for traffic signals, roadways, and a city's future transportation roadmap.

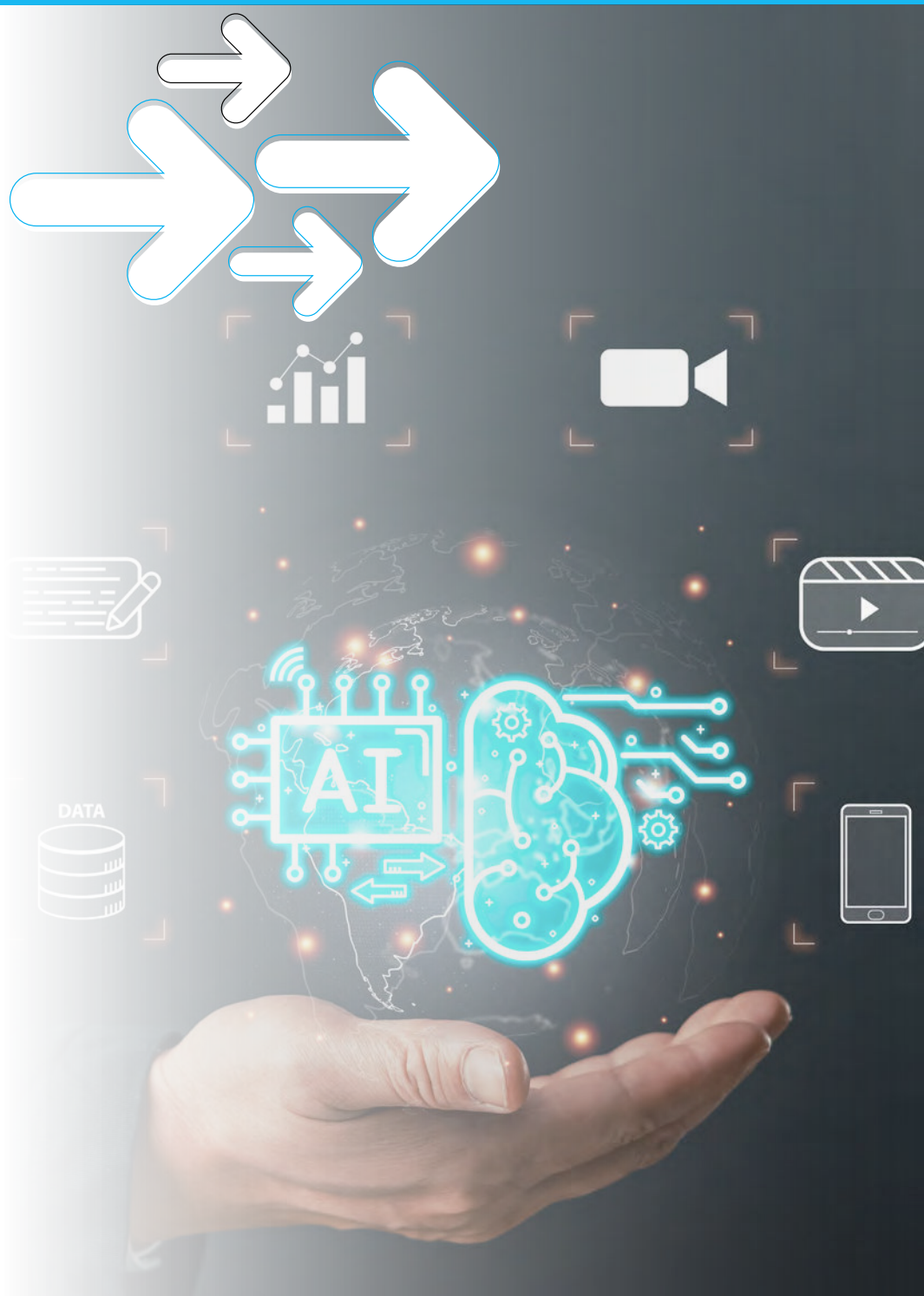
With the vertical-specific cyRoad video intelligence solution, the national road transport authority transformed its road and junction monitoring capabilities, achieving better safety outcomes and laying the foundation for a more efficient and adaptive urban transport system.

Conclusion

The evolution from traditional video surveillance to agentic AI-powered video intelligence has not been a straight line. Advances in AI technologies have driven pivotal shifts in how machines perceive, process, and act on video data. With the integration of domain-specific VLMs, LLMs, RAG, and AI agents, video is no longer just a passive stream to be reviewed. It is a proactive, context-aware tool. At the heart of this transformation is the creation of a contextual data lake that can be queried, analyzed, and acted upon.

As seen in critical industries such as seaports, airports, and road transportation, the ability to define custom events of interest, automate complex workflows, and generate actionable insights from video in real time and offline opens up a new dimension of capabilities. cynapse.ai's cyVisionGPT and its suite of verticalized solutions (such as cyPort and cyRoad) demonstrate the transformative impact of robust video intelligence: increasing safety, strengthening security, improving compliance, optimizing operations, and driving long-term strategic outcomes.

As the challenges facing mission-critical industries grow more sophisticated, so must the tools organizations rely on. Agentic AI Video Intelligence isn't just the next step in video analytics; it's a new way of seeing, understanding, and extracting meaning from everything the cameras capture.



To learn more about how cynapse.ai's verticalized Agentic AI video intelligence solutions can meet your security, safety, and operational goals, visit: www.cynapse.ai

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