Solution Brief

Computer Vision
Edge Inferencing
AI and Analytics
Internet of Things (IoT)

meldCX™ Uses Synthetic Data to Extract and Convert Behavioral Video Data for More-Engaging Customer Experiences

Viana™, powered by Intel, works the intelligent edge to unpack data into actionable insights

Businesses, enterprises, and reseller partners consistently look to add value to their services portfolio through premier customer experiences. An effective focus is to use artificial intelligence (AI) and intelligent edge technologies to turn video data into valuable business intelligence. This intelligence yields insights into such things as recognizing in-store customer behavior patterns, understanding potential sales conversion points, improving customer experiences, developing loss prevention strategies, and optimizing business operational efficiencies.

By 2025, it's estimated that 463 exabytes of data will be created globally every day, which is the equivalent of 212,765,957 DVDs per day.[1] Organizations must find a way to make intelligible sense of this exponentially increasing amount of data; AI is the tool that makes the influx of data from the Internet of Things (IoT) meaningful. Research shows that AI makes IoT data 25 percent more efficient and analytics 42 percent more effective.[2]

Challenge: Exponential data requires accessible off-the-shelf AI compute

Building a machine learning model is both costly and time-consuming. Even more, a Gartner prediction states that 85 percent of AI and machine learning projects fail to deliver, with only 53 percent of projects making it from prototypes to production.[3] According to Gartner, these projects are doomed because of bias in data, algorithms, or the teams responsible for managing them. And yet there is scarcely any slowdown in AI investments; in fact, many organizations plan to increase AI investments. At the same time, many companies do not have the in-house expertise to build the AI architectures needed, particularly to convert video data into analytical insights.

Solution: Translating video data into anonymized metric data for informed business decisions

While AI answers the challenge of unpacking video data through analytics into insight, organizations often do not know how to properly deploy AI for success. meldCX™, applying Intel® technologies for their Viana product, helps end users improve customer experience and maximize efficiency through AI. The Viana platform is designed to be scalable and flexible—using digital building blocks from which users can simply pick and choose and then stack their desired use case with minimal coding required. For highly specialized use cases, meldCX offers custom solutions. The product also enables resellers to support their customers in getting more from their data as a value-add to their existing services portfolio.

Essentially, meldCX teaches autonomous cameras to see, analyze, and make actionable decisions seamlessly. With the help of the Intel® Distribution of OpenVINO™ toolkit, meldCX has developed a product called Viana, which anonymously gathers and interprets video data to harness the power of machine learning (ML) in solving complex problems and automating processes. Synthesized data inputs can be presented to be understandable, configurable, and palatable for business operators as results through a single dashboard, actions, or human interceptions triggered through numerous integrations, surfaced as reports, or sent to the customer's data lake (e.g., Snowflake, Salesforce). These reporting options make it simpler to benefit from practical data science to make smart business decisions.

How it works

Developers appreciate the ability to deploy multiple AI stacks that can speak to each other at the edge as well as anonymous vision AI capabilities. In terms of privacy, Viana does not see, view, or annotate any personal, identifiable, or sensitive live data in the cloud. Instead, data is extracted as it passes through the system without recording or storing any footage. During processing, faces are blurred, and humanized data captured is saved as a "token," or randomized number, in the system. Objects (e.g., clothes someone is wearing) and nonface behavior (e.g., gait and aggressions) add more detail and depth to each anonymized persona.

The reference models used to build Viana's AI are synthetic (meaning not based on actual/identifiable persons), like a virtual 3D environment. Essentially, Viana does not perform any type of facial recognition; instead, captured data points are nonidentifiable and anonymized. Further, meldCX has also taken the stance of making sure its synthetic data models have no identifying qualities that indicate race.

While video data is useful to monitor foot and vehicle traffic, prevent losses, and support security needs, ensuring data privacy is a priority for meldCX. That's why Viana uses synthetic data to anonymize data inputs. Through the generative adversarial networks (GANs) method, Viana implements what is called a "game engine" to create synthetic data in its virtual world. The results are tighter privacy compliance—as no identifiable real data is captured—as well as reduced costs in the data-gathering stage of the machine learning workflow.

meldCX uses synthetic data to train AI models for Concept SALi, a smart parcel lodgement kiosk that can scan and detect packages––automatically verifying their size, weight, handwritten information, the sender's identity, and shipping cost. This removes the guesswork, manual entry, and complexity from shipping a package for both customers and post office employees.

Generative adversarial networks (GANs) are algorithmic architectures that use two neural networks, pitting one against the other (thus the "adversarial") to generate new, synthetic instances of data that can pass for real data.

Viana's built-in computer vision applications

meldCX developed Viana by working with Intel technologies, including the Intel Distribution of OpenVINO toolkit, for the following reasons.

Accelerate performance: Expedite inference engine processing to improve performance, so machine learning models can keep up with and process heavier loads of data, as detailed in this video.

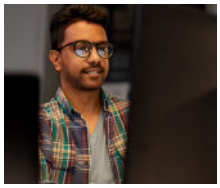
Process data at the edge without the need to upload raw data to the cloud: Improve security and protect data privacy.

Streamline deep learning deployment: Use OpenVINO's Intel® oneAPI, plus more than 30 pretrained models and documented code samples.

Connect quickly to hardware sensors/cameras: Deploy prebuilt OpenVINO modules to detect and track the video feed of any digital camera (IP cameras, webcams, etc.) as well as support multicameras.

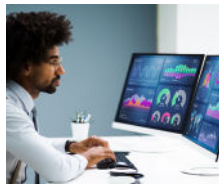
As a result of the Intel technologies used to achieve these outcomes, meldCX's Viana product can deliver several key benefits to customers, including the following.

Tell timely data stories about customers



Set up without developer intervention

Easy retrofit for existing hardware



Anonymous vision analytics

Real-time insights

Single-click install

These benefits are delivered through Viana's™ built-in applications, using synthetic data to anonymize data and ensure privacy, including:

Anonymous audience measurement – Capture anonymous information such as age, gender, mood, and amount of time spent inside a physical space

Content effectiveness – Get insights on which content attracts which audience at certain times of the day

License plate recognition (LPR) – Gather vehicle information such as license plate number, vehicle color, vehicle type, and direction; note there is an option to identify vehicles without LPR as well

Parking management – Capture traffic data like vehicle entry and exit time, parking count and occupancy, and visit duration

Programmatic advertising – Deliver content at the right opportunity

Traffic measurement – Capture traffic data such as vehicle count, speed, and direction

People counting – Monitor foot traffic and specialized zones within a space

Zone engagement – Monitor occupancy and amount of time spent within a physical space

Surface awareness tracking for cleaning compliance – Send cleaning reminder notifications straight to cleaning staff's mobile devices when a surface has reached a certain touch threshold

Additionally, there are custom solutions for specialized use cases, underpinned by custom model training, deep coding, and integration, as required, which deliver results in shorter time frames using fewer resources, including:

- Human activity training, such as aggressive behavior detection and loss prevention.
- Environmental awareness for potential hazards or safety concerns that could have a negative impact, such as a potential "slip and fall" situation.
- Scan/analyze/manifest: Specialized industrial applications, such as assembly lines, shipping environments, and manufacturing scenarios.

The technologies behind Viana's AI video data analytics

Viana's off-the-shelf and custom applications are powered by Intel technology for faster processing through edge inferencing. Viana delivers data capture and vision analytics on audience behavior without collecting personally identifiable information, or PII.

meldCX offers Viana software in four package tiers based on use case needs: Lite, Standard, Premium, and Enterprise. All packages include ML model retraining with quarterly updates, customer care (24/7 unlimited call, chat, and email support), onboarding support (deployment, training, and handover), and access to the Viana toolkit (manuals, training materials, and resources).

By applying Intel technologies to specific industry challenges, the meldCX team found that using both Intel® Core™ processors and OpenVINO enabled:

- Improved latency across all devices
- Reduce cloud workloads
- Edge computing, decreasing the need for sensitive data to be uploaded to the cloud

Expedited inference engine processing through Intel technologies means Viana can handle heavier loads of data for faster time to market. In working with customers, the meldCX team found each camera collects massive amounts of raw data each week, but only a small portion of it is considered valuable. By using OpenVINO, Viana has been able to reduce its compute requirements through optimizations of its ML models.

Use cases

Financial services use case

A banking customer had invested significant time and money into signage content but had very little visibility into how their campaigns were performing in branch. It was a challenge to determine which screens attracted the most viewers, who was viewing the content, and what content they had consumed, which was particularly important with 72 different financial product categories. They also wanted to track their in-branch content by zones, which meant monitoring both foot traffic and eyeballs. Further, they wanted to know what visitors were doing in other branch zones.

They chose to use off-the-shelf modules from Viana, specifically Anonymous Audience Measurement, to gather insightful video data stories about their audience, such as age, gender, mood, and time spent in store. Further, to gauge engagement, Viana tracked "eyeball to content" for digital signage campaigns by combining audience data and proof of play, yielding insights on content effectiveness by monitoring how audiences interacted with their content.

See the Self-Service Banking 2021 video.

After running Viana for 20 months, the institution found that, despite the pandemic, banking customers still valued in-branch visits and in-branch content.[4] This campaign engagement validation resulted in data-driven decisions about future content offerings, programmatic automation, and campaign investments for more customer value and maximum conversions. Using vision analytics is now planned for future inclusion in branch strategies and campaigns for improved customer service and financial product conversions.

Read the white paper on how Viana bridges the gap between physical and digital channels.

Shipping business custom use case

A regional post office was looking to accommodate amplified parcel load because of increased online retail spending. This was a challenge given that staff were being overworked and customers had to wait longer to get their parcels delivered as a result. Their solution focus was to shift to a digital-first model, driving innovation, simplicity in customer interactions, reduced person-to-person contact, and increased system efficiencies.

meldCX delivered Concept SALi, or Smart Automated Lodgement API, a self-service kiosk that automates the parcel lodgement process by using powerful machine learning and Intel-powered computer vision technology as well as synthetic data to train the AI model.

See how meldCX uses synthetic data in building SALi's data engine model.

The post office gained insight into customer behavior as well as performance improvements. Video analytics resulted in package scanning being completed quickly, with automatic accurate address recognition, eliminating the need for paper forms and decreasing in-branch queue wait times.[5]

Hospitality use case

A hotel provider wanted to gain a competitive advantage through enhanced customer service as well as address operational efficiency, cost savings, cleanliness, and security by leveraging AI and video technologies. By using Viana's Anonymous Audience Measurement and Surface Awareness Management Intelligence for Environment (SAMi), meldCX was able to monitor foot traffic patterns, people counting, VIP detection, and behavioral patterns to note the effectiveness of digital signage.

See the Demystifying Computer Vision for the Hospitality Industry video.

The results realized for this hospitality business included real-time actionable insights on curated and contextualized customer experiences without retaining identifiable information. This intelligence supported more-efficient customer service as well as greater visibility of digital signage content for future guest promotions and communications.[4]

Entertainment use case

An establishment determined it would be beneficial to detect on-site traffic patterns, both vehicle and people, as well as peak hours to manage zones and ensure guest safety. One of the goals was to monitor potential aggressive or intoxicated behavior for security. Additional desired outcomes included the ability to recognize VIP guests to alert staff for customer service purposes and deliver timely and relevant content via digital media systems.

Accordingly, the establishment chose to use Viana for Anonymous Audience Measurement and SAMi to gain insight on guest behavior, foot traffic patterns, and content consumption. They also measured vehicle traffic, including license plate recognition for parking management capabilities and person of interest (POI) detection for on-site VIP customers. Video analytics help ensure a cohesive omnichannel customer experience.

See how Viana monitors vehicle traffic.

As a result of Viana's video analytics, the organization gained real-time actionable insights to improve overall efficiency, curate and contextualize customer service, and ensure guest safety.[4]

Conclusion: Game-changing vision analytics capabilities

The meldCX team's results for their customers include providing real-time insights to support delivering premier customer experiences. The ability to stack multiple video data AI models simultaneously through Viana, depending on business needs, with results reflected in a single dashboard, has unlocked deep data for usable intelligence. Since Intel technologies have AI capabilities built in, the software is optimized for streamlined use. With edge inferencing supported by Intel, no sensitive data is uploaded to the cloud, and processing is done at the edge, so meldCX can offer a better security framework. And streamlined deep learning deployment with Intel oneAPI speeds build time for faster value to market for meldCX's customers.

Using OpenVINO for edge inferencing, Viana has also reduced its cloud compute power requirement by 37 percent. Raw machine learning models normally running at 100 percent are optimized to 65 percent average performance.[4]

Additionally, the meldCX team reports that, with Intel Core processors and OpenVINO, their team was able to optimize performance, reduce infrastructure needs, and speed up their build processes with fewer staffing resources.

In terms of the strategic benefits of using the Intel Distribution of OpenVINO toolkit, the meldCX team feels it has been a game changer for their solutions as an innovative data platform that empowers go-to-market build speed, so time to value is reduced. Additionally, having access to Intel's comprehensive partnership ecosystem has been a resource for deep expertise, as needed. And OpenCL applications have provided an open and royalty-free way to expand their use cases.

Intel technologies used:

Intel® NUC Mini PC with 10th Generation Intel® Core™ processors
The Intel® NUC 10 Performance Mini PC has the power to create content as well as consume it. Record and mix music, add animation effects to video edits, or stream online content in ultrahigh-def 4K. This Intel NUC Mini PC brings full-size PC performance at a size small enough to fit in the palm of your hand.

Learn more ›

10th Generation Intel® Core™ i7 processors
10th Generation Intel Core i7 processors power high-end PCs with industry-leading CPU performance for discrete-level graphics and AI acceleration.

Learn more ›

OpenCL applications
Develop using the Intel® CPU Runtimes for OpenCL™ Applications as a test environment for OpenCL devices, such as Intel® Graphics Technology and Intel® FPGAs.

Learn more ›

Intel Distribution of OpenVINO toolkit
The Intel Distribution of OpenVINO toolkit helps accelerate the development and deployment of machine learning solutions.

Learn more ›

Intel oneAPI
The Intel® oneAPI Base Toolkit (Base Kit) is a core set of tools and libraries for developing high-performance, data-centric applications across diverse architectures.

Learn more ›

About meldCX™

meldCX, a global technology firm headquartered in Australia that helps businesses and enterprises, as well as reseller partners who want to add value to their services portfolio, meld premier customer experiences. The focus is to use artificial intelligence (AI) and intelligent edge technologies to turn video data into valuable business intelligence.

Viana™ is meldCX's flagship product that yields intelligent insights into such things as recognizing in-store customer behavior patterns, understanding potential sales conversion points, improving customer experiences, developing loss prevention strategies, and optimizing business operational efficiencies.

intel + meldCX™

Notices and disclaimers

1. Jeff Desjardins, "How much data is generated each day?" World Economic Forum, April 17, 2019, https://www.weforum.org/agenda/2019/04/how-much-data-is-generated-each-day-cf4bddf29f/.
2. "Artificial Intelligence in Big Data Analytics and IoT: Market for Data Capture, Information and Decision Support Services 2022 – 2027," Research and Markets, April 2022. https://www.researchandmarkets.com/reports/5387756/artificial-intelligence-in-big-data-analytics-and.
3. Steve Nunez, "Why AI investments fail to deliver," InfoWorld, November 15, 2021, https://www.infoworld.com/article/3639028/why-ai-investments-fail-to-deliver.html.
4. Results are indicative based on a subset of customer operational models in the meldCX lab. There are many factors that contribute to model performance and benchmarks; as such, represented results should be considered as indicative only and should not be a basis in forming a decision.
5. "Australia Post + meldCX: Reimagining package shipping", 2022, https://www.meldcx.com/customers/australia-post.

Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

Intel® technologies may require enabled hardware, software, or service activation.

No product or component can be absolutely secure.

Your costs and results may vary.

Intel is committed to respecting human rights and avoiding complicity in human rights abuses. See Intel's Global Human Rights Principles. Intel® products and software are intended only to be used in applications that do not cause or contribute to a violation of an internationally recognized human right.

0922/AC/CMD/PDF