FACTSHEET

BRINQ™

Edge AI and Vision Analytics

Arcturus
We are Edge.

Edge AI and vision enablement for public safety, security and situational awareness

OVERVIEW

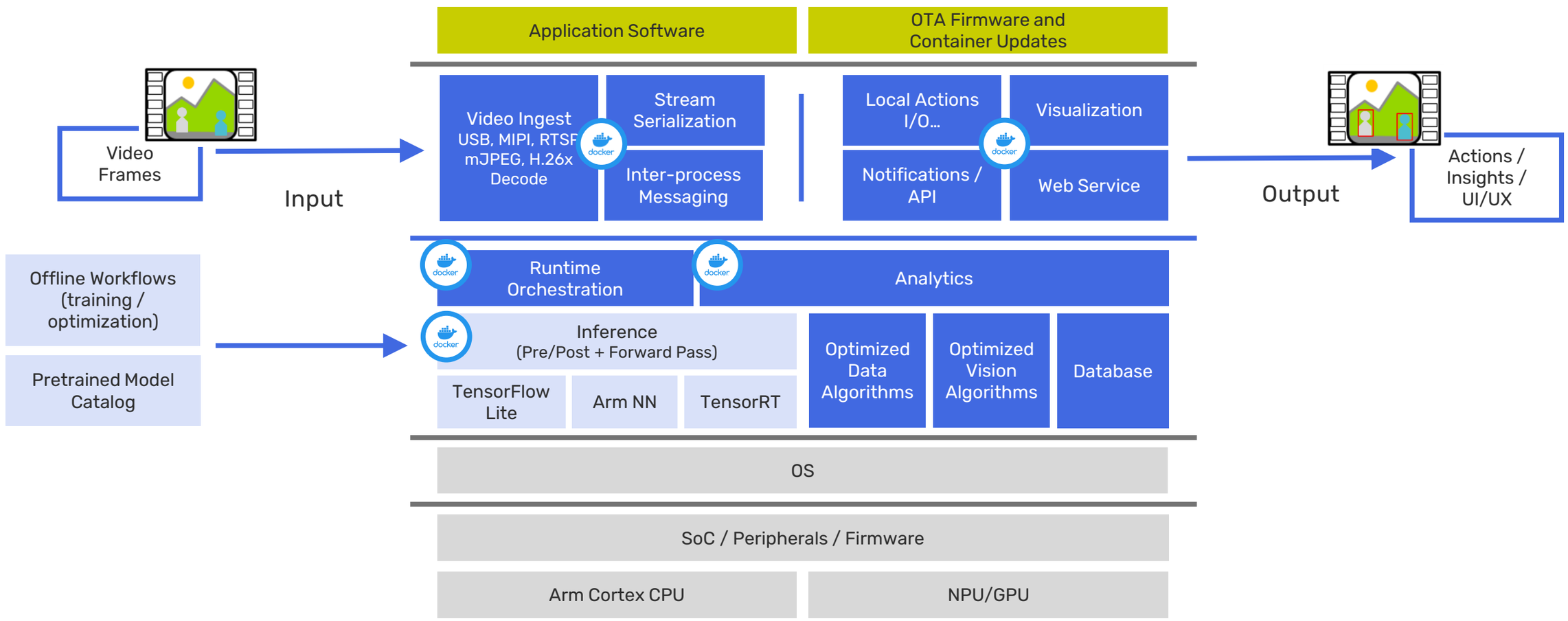
Brinq is designed to help with every aspect of 2D or 3D edge AI and vision system development. It targets real-time applications that need to generate meaningful insights from video data on-premises, without requiring cloud or server connectivity. Brinq offers a full-spectrum of solutions from edge AI models, model training and enablement to turn-key analytics applications and hardware.

Brinq is built around a core of set of ML models, dataset and training tools, combined with a runtime environment that makes use of multiple opensource industry frameworks with published and proven performance numbers. This means that Brinq does not vendor-lock by using an unsustainable model or proprietary runtime. Instead, Brinq provides a novel microservices pipeline architecture with almost limitless flexibility to build sophisticated analytics. It allows vision pipelines to span disparate hardware accelerators or compute devices seamlessly and offers runtime orchestration to facilitate rich experimentation, without having to refactor code. This means that Brinq can not only provide a broad set of edge AI analytics, but it can also provide a path to help enable internal teams via a pre-existing software and tools ecosystem, combined with expertise from Arcturus.

- ✔ EDGE AI AND VISION EXPERTS
- ✔ TURN-KEY SYSTEM SOLUTIONS
- ✔ ML ENABLEMENT AND OPTIMIZATION
- ✔ ALGORITHM DEVELOPMENT
- ✔ EDGE AI RUNTIME ENVIRONMENT
- ✔ NPU/GPU ACCELERATED EDGE HARDWARE

NXP arm NVIDIA kinara VeriSilicon

Edge AI and vision enablement



Models and Training

Brinq provides a comprehensive pretrained model catalogue containing industry standard object detection, segmentation, tracking, characterization, feature extraction and action recognition models. Models are validated and optimized by Arcturus to run on edge hardware from our partners Arm®, NXP, NVIDIA, Verisilicon and Kinara. By leveraging our pretrained model catalogue and Tensorboard or Pytorch-based training tools, Brinq can significantly decrease the time it takes to implement, optimize and qualify edge AI inference.

Model Optimization

Different hardware requires different model precisions, models need to be quantized from floating point 32 (FP32) to FP16 or INT8 to perform optimally on GPUs or NPUs. Our expertise includes the following performance or accuracy optimization techniques:

- Model quantization
- Model ensembles
- Test Time Augmentation (TTA)
- Batch processing
- Image tiling
- Model scheduling
- Model pruning
- Model depth reduction
- Model format conversion
- Model benchmarking

Dataset Tools

Improving datasets, improves the data available to train, fine-tune or evaluate a model. We utilize industry standard TensorBoard frameworks to build better models that perform better under generalized or real-world conditions. Available dataset tools include:

- Dataset scraping
- Dataset curation
- Dataset augmentation
- Synthetic data creation

Runtime Pipelines

Brinq runtime software implements a containerized microservices architecture that allows edge AI pipelines to span across hardware resources, incorporating multiple CPUs, NPUs or GPUs. This makes it possible to optimize performance by aligning specific ML workloads to the most suitable hardware. Brinq pipelines are orchestrated at runtime to facilitate experimentation without needing to refactor code. Inference nodes utilize leading runtime frameworks including Arm NN, TensorFlow, TensorFlow Lite, TensorRT and Triton, with support for uff, ONNX, TFlite, and Pytroch model formats.

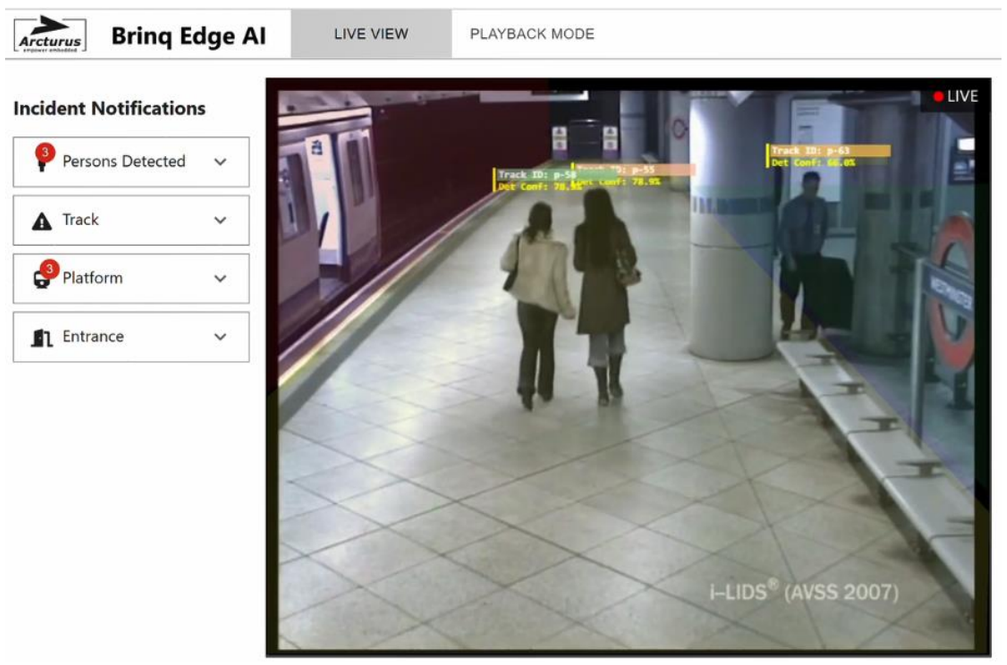
Edge AI and vision enablement

ANALYTICS AND APPLICATIONS

Boundaries and Zones

Virtual boundaries and zones provide alerts when people or vehicles appear, enter or exit. It is a key primitive for safety, security and operational analytics.

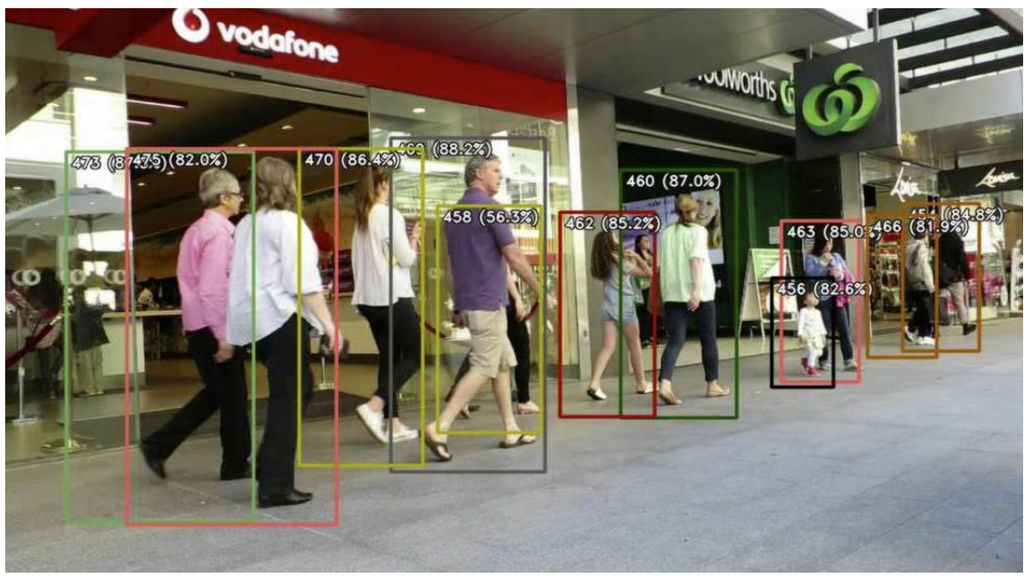
- Appearance and counting
- Zone incursion, intrusion
- Capacity estimation



Tracking and Reidentification

Multiple object tracking is used as a primitive for analytics that need to understand how unique objects act over time. Brinq provides both tracking, reidentification and evaluation capabilities including:

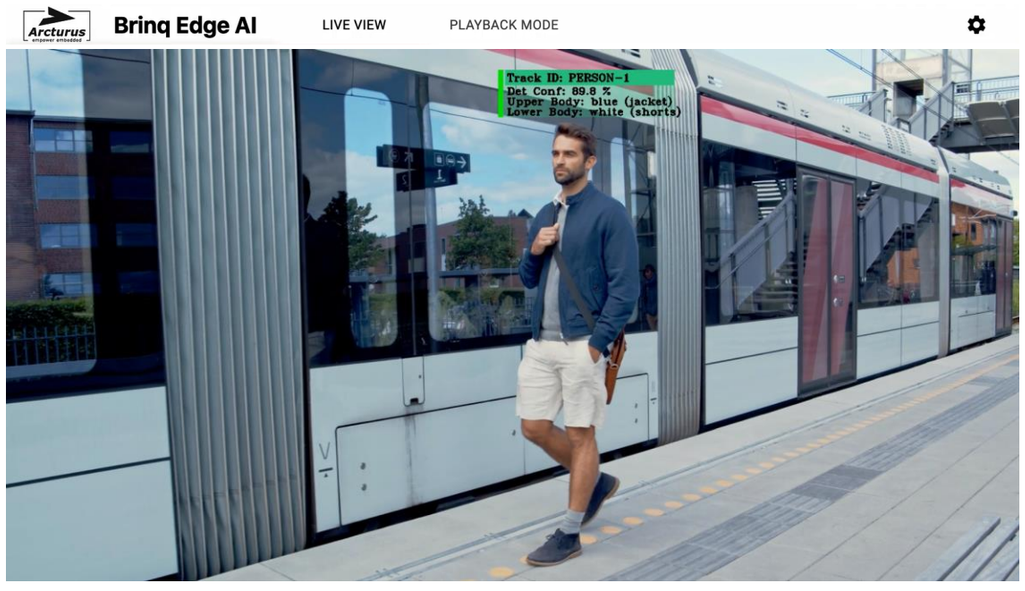
- Motion prediction tracking
- Feature based tracking
- Optimized ByteTrack tracking
- Optimized DeepSort reidentification
- MOT evaluation tools and published MOTA results



Characterization

Characterization describes objects using human terms including attributes that can provide insights useful for retail or public safety.

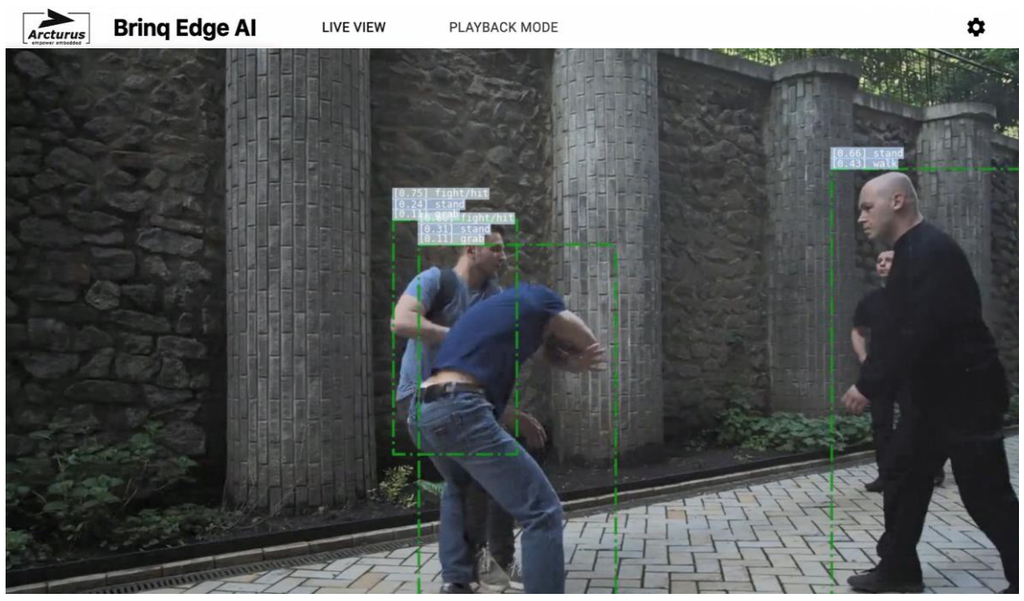
- Articles of clothing
- Clothing colour
- Age / gender
- Vehicle type, make or model
- PPE (mask wearing compliance)



Action Recognition

Action recognition described the activities in a scene by using action classes that range from normal activities such as walking to violent actions.

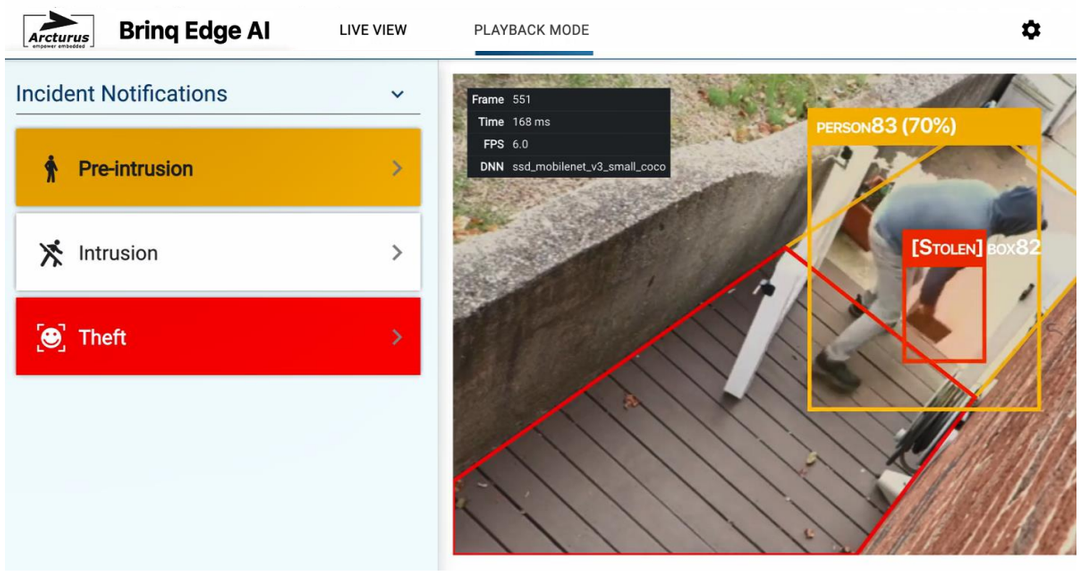
- 80 (AVA) or 700 (Kinetics) action classes
- Normal or abnormal behaviours



Package Analytics

Brinq package analytics use custom trained models to improve detection across package classes and include algorithms for:

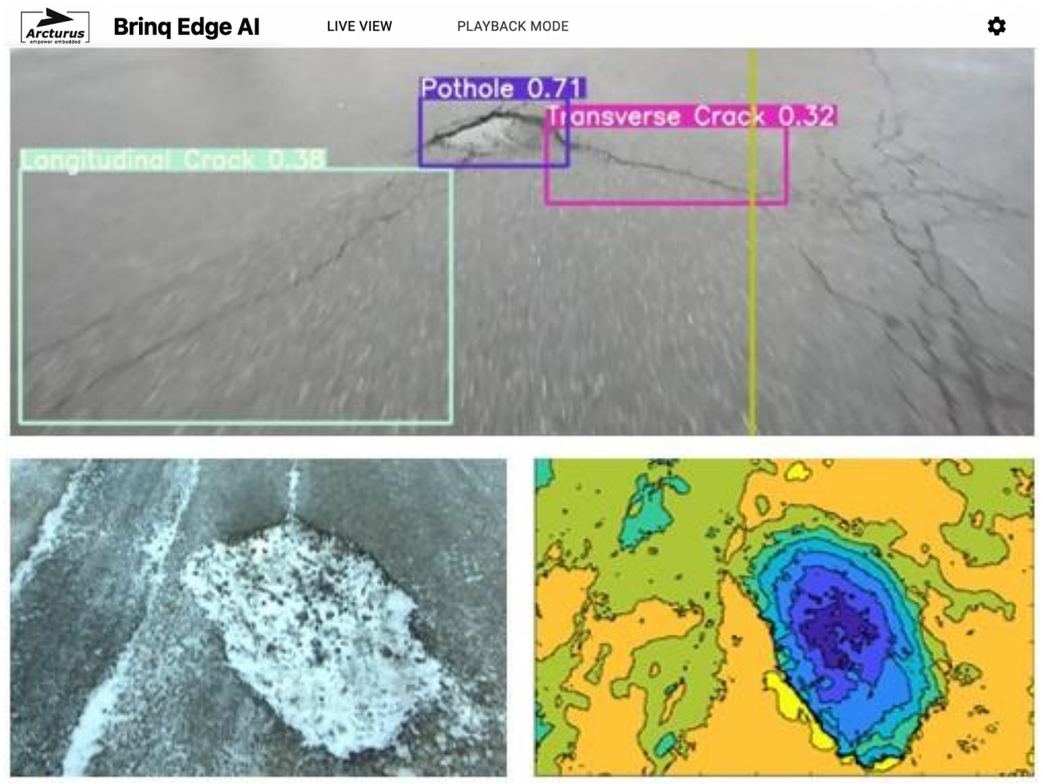
- Package security / theft
- Package ownership / abandonment



3D Stereoscopic Inspection

Brinq RGB and RGBD (RGB+Depth) provides 2D and 3D analysis. Ideal for combined visual / volumetric inspection or proximity-based tasks.

- Surface inspection and analysis
- Volumetric measurement
- Proximity and distance
- 3D object detection



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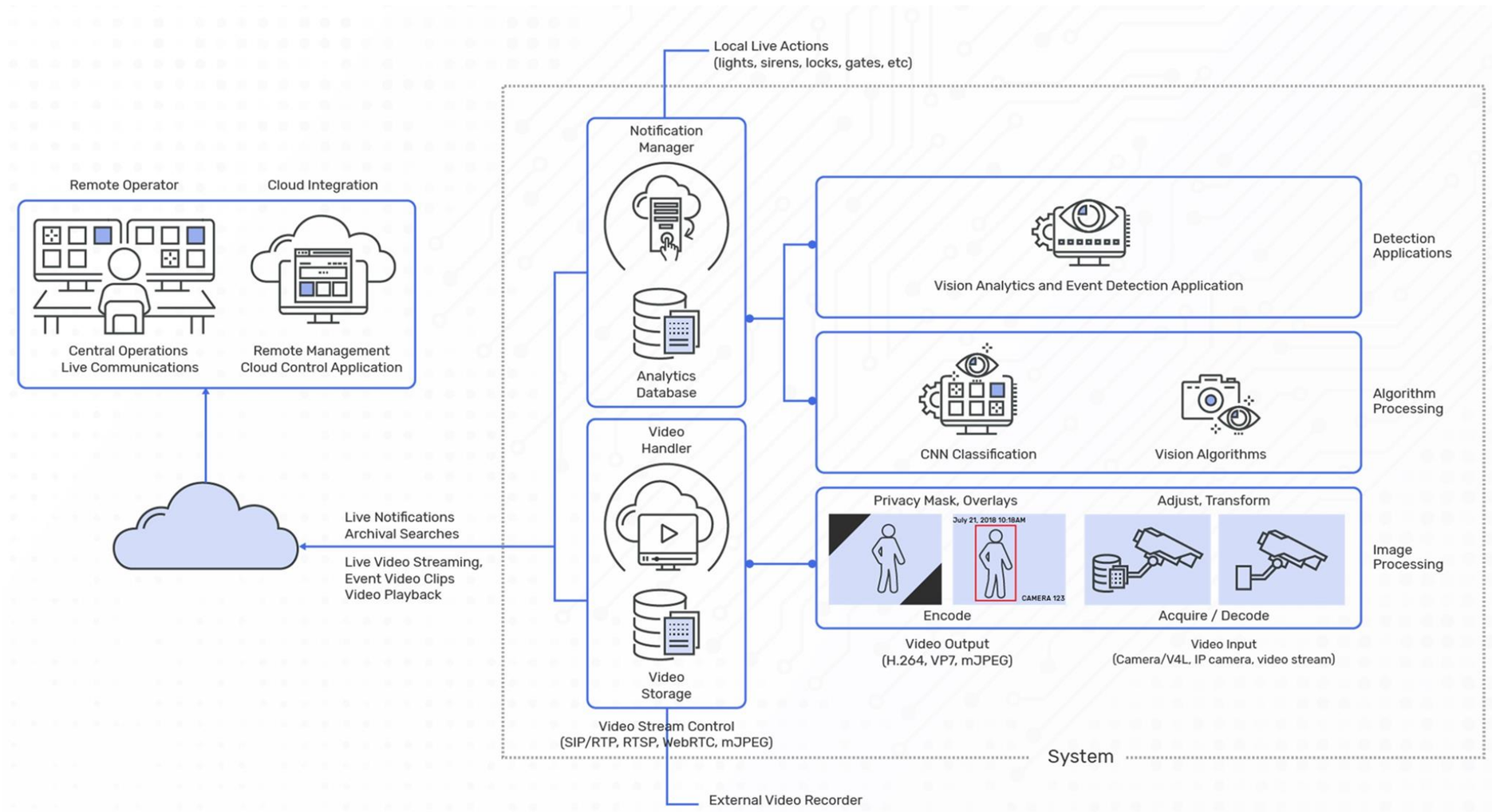
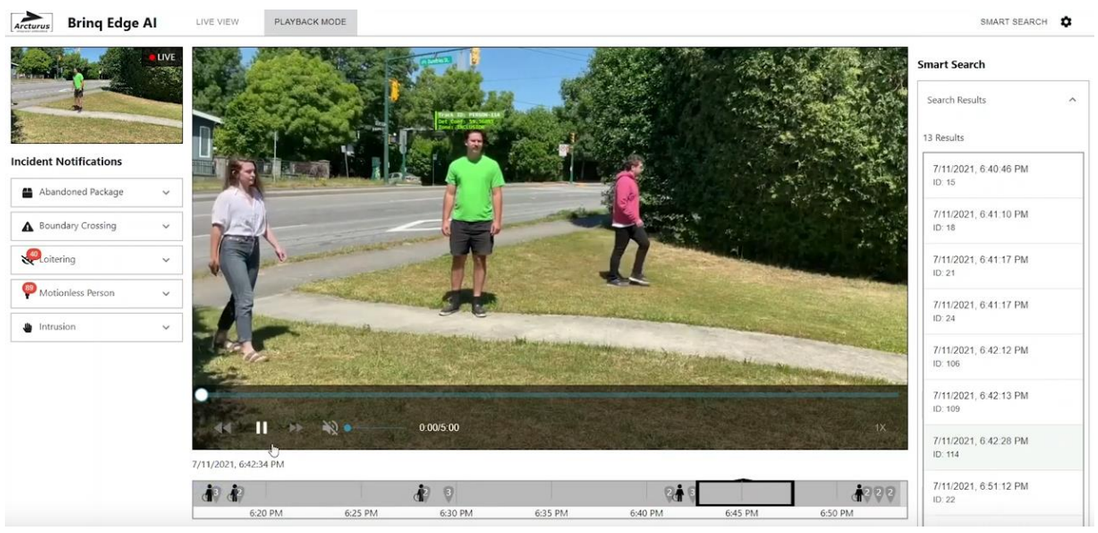


INTERACTION AND INTEGRATION

Brinq analytics report events via incident notifications that can be presented on a web interface or distributed using a secure host protocol for deeper system integration.

Brinq also supports a complete UI/UX system for analyst workflows, analytics setup and system settings. Event notifications are presented in real-time and added to a timeline for event playback. The UI/UX implements sophisticated features such as smart searches using characterization attributes, zone configurations, scheduling and smart notifications.



EXPERT SOLUTIONS

For specialized 2D (RGB) or 3D (RGBD) vision applications Arcturus provides access to our in-house ML and data science experts, application architects and hardware designers. Engagements provide a way to access a diverse set of pre-existing technologies and expertise in ML enablement, algorithm creation, ML optimizations or complete system solutions. This helps manufacturers reduce project risk and decrease time-to-market, translating into a lower total cost of ownership. Arcturus offers simple engagement packages to help get development moving quickly.

EDGE AI HARDWARE

Whether you want to design your own chip-down solution or leverage boards like our Atlas scalable edge AI platform to accelerate time-to-market, Arcturus offers hardware, design services and support to help. We have hundreds of thousands of devices in service and we leverage this expertise to help you.

- Quality - Field failure rates as low as 0.1% / 10,000 units
- Longevity - Product life-cycles in excess of 20+ years
- Time-to-Market - Boards and modules ready to integrate
- Reduced Risk - Hardware and software expertise, support
- Lower Cost of Ownership - Software ready for deployment, reduces development cost

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