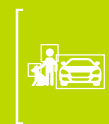




AI-enabled Video Analytics

Powered by DeeperLook™ Artificial Intelligence (AI)
& Deep Learning (DL) Framework





AI-ENABLED VIDEO ANALYTICS

Powered by DeeperLook™ AI (Artificial Intelligence) & DL (Deep Learning) Framework

Videonetics AI-enabled Video Analytics software analyses, extracts and generates actionable information from a humongous amount of video or image data. Powered by a novel Artificial Intelligence (AI) and Deep Learning (DL) framework (DeeperLook™), it is designed to serve as an intelligent decision support system for users.

■ Versatile, Futuristic and Offering Unmatched Precision

DeeperLook™ is an AI & DL based framework for development and implementation of distributed video and data analytics solutions. The framework is highly customisable, compute efficient, and compatible with both on-premise, edge-based and cloud-based computing environments. It uses a collection of indigenously designed AI and DL engines, each computationally optimised for a specific set of tasks. The framework is reconfigurable with interconnection of these engines and hence suitable for domain-specific customised video analytics application development.

DeeperLook™ is a perfect fit for Video Internet of Things (VIoT) applications, with its fog computing capabilities, in which computing load is judiciously distributed across edge and central computing resources. It is agnostic to operating systems and cloud platforms, thus providing maximum flexibility to the users and ensuring the lowest total cost of ownership (TCO).

A patented and award-winning technology, DeeperLook™ powered solutions ensure the highest level of accuracy by detecting various patterns, features, intrinsic, object attributes, activities, actions, behaviours and events, using a novel continuous and self-learning mechanism.

■ With the power of AI

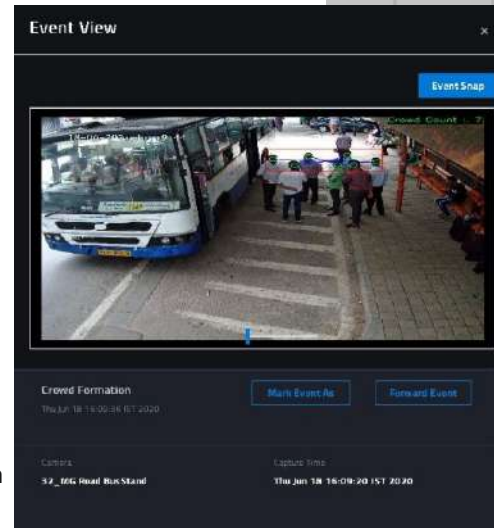
Our framework offers over a hundred state-of-the-art use cases across industry segments. It provides accurate and timely alerts on detection of anomalies with highly optimised computing resources. Field-proven in diverse environments and challenging conditions, DeeperLook™ AI & DL powered Video Analytics is the reliable choice for smart/ safe cities, aviation, mass transportation, small to large enterprises, critical infrastructure projects, retail stores, correctional homes, BFSI, educational institutions and healthcare, to name a few. It supports a wide range of solutions as mentioned below:

- | | | |
|---------------------------------|--|---|
| ▪ People Analytics | ▪ Law Enforcement Analytics | ▪ Retail Analytics |
| ▪ Object Analytics | ▪ Urban & Municipal Analytics | ▪ Tracking Analytics |
| ▪ Crowd Analytics | ▪ Industrial Safety & Health Analytics | ▪ Pandemic Management Analytics |
| ▪ Vehicular Analytics | ▪ Face Recognition Analytics | ▪ Forensic Investigation & Smart Search Analytics |
| ▪ Traffic Enforcement Analytics | ▪ Women Safety Analytics | |
| ▪ Highway Traffic Analytics | | |



People, Object and Crowd Analytics

Videonetics AI-enabled Video Analytics can help users track and identify anomalies in a scene in real-time, whether they pertain to object, people, or crowd. These analytics are relevant and highly effective for diverse scenarios, be it a corporate office, airport, street, or mall. The insights provided by the analytics software give unprecedented control to the operators, enabling them to handle a developing situation in a timely manner.



■ People Analytics

- Intrusion/ Trespassing
- Loitering, Dwell Time
- People Tracking & Trajectory
- 'Laxman Rekha' Violation
- Perimeter/ Fence Jumping
- People Count, Occupancy
- Entry/ Exit Count
- Walking/ Running
- Gesture Detection
- Tailgating/ Piggybacking
- Person Collapse/ Fall & Slip

■ Object Analytics

- Moving Object Detection
- Object Classification & Counting
- Camera Sabotage Detection
- Unattended Object Detection
- Who left that Object
- Artefact Protection & Theft Detection
- Object Tampering
- Colour Detection
- Attribute Analysis & Search

■ Crowd Analytics

- Crowd Formation & Estimation Detection
- Crowd Dispersion Detection
- Crowd Anomaly Detection
- Crowd Statistics & Heatmap
- Queue Length Detection
- Queue Limit Exceed Detection
- Wait Time in a Queue/ Lift Lobby
- Social Distancing in a Queue

■ Integrations

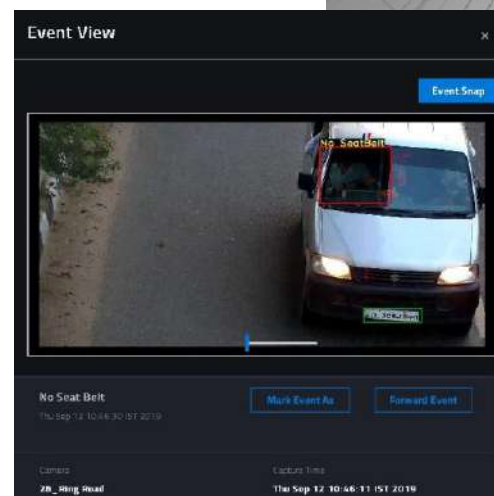
- Access Control & Physical Barriers
- SCADA Systems
- Fire Alarm System
- Building Management System
- Text, Voice, WhatsApp & Email
- Audio Visual Annunciators
- Intrusion & Break Detection Sensors
- Elevator Controllers



Intelligent Traffic Management System

Videonetics Intelligent Traffic Management System (ITMS) offers various vehicular and traffic management analytics to detect and track vehicles, extract attributes of vehicles including registration number, colour, make and model, detect various types of rule violations, understand traffic patterns and traffic behaviours by generating multi-dimensional data, helping enforce traffic rules, and notifying violators. By inculcating traffic discipline among people, it contributes to making traffic management more robust, and to improving road safety. The system offers unique investigation features to detect wanted vehicles, traces the trajectory of vehicles, and identifies them with attributes, location and time.

It supports 'vernacular' license plates in regions across the globe, such as the Indian Subcontinent, Southeast Asia, Western Europe, Gulf and Latin America. DeeperLook™ provides a versatile engine which easily adapts to the local requirements and syntax of license plates, vehicles types, traffic regulations and data requirements. It also offers a secure and flexible framework to integrate external systems, such as vehicle registries or motor vehicle database, electronic ticketing and violation



prosecution systems, radar, automatic traffic control, toll ticketing, GIS maps, and command and control systems. Videonetics also supplies a versatile e-ticket management system to notify the violators, and also generate tickets embedded with evidence and related data, as per the guidelines of the concerned traffic enforcement agency.

■ Vehicular Analytics

- Vehicle Classification & Counting
- Traffic Volume Estimation
- Automated Number Plate Recognition
- Vernacular ANPR
- Dilapidated/ Missing Number Plate Detection
- Non-standard Number Plate Detection
- Vehicle Colour, Make & Model Detection
- Congestion Detection
- Parking Violation Detection
- Smart Parking
- Virtual Loop

■ Traffic Enforcement & Safety Analytics

- Red Light & Stop Line Violation Detection
- Speed Violation Detection
- No Helmet & Triple Ride Detection
- No Seat Belt Detection
- Detection of Cellphone Use While Driving
- Wrong Way & Illegal Turn Detection
- Free Left Lane Blocking
- Driver Smoking Inside Vehicle Detection
- Detection of Stopped or Broken-Down Vehicle on Road
- Hot-listed & Stolen Vehicle Detection and Tracking
- Traffic Volume Estimation

■ Highway Analytics

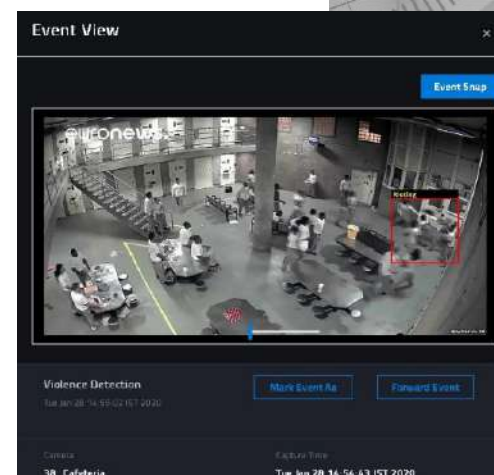
- Vehicle Classification & Counting
- Video-based Spot & Average Speed Detection
- Non-standard Number Plate Detection
- Dilapidated/ Missing Number Plate Detection
- Traffic Volume Estimation
- Speed Limit Management (based on Vehicle Class)
- Average Corridor Speed Management (by Vehicle Category)
- Detection of Banned Vehicle Category
- Zig Zag Driving Detection
- Lane Monitoring/ Lane Violation Detection
- Detection of Object Fallen on Road
- Detection of Oversized Vehicles

■ Integrations

- Traffic Ticketing
- Vehicle Registry
- Motor Vehicle Database
- Police FIR Systems
- Toll Plaza Systems
- Radar
- Advanced Traffic Control Systems (ATCS)
- Signal Controllers
- GIS Maps
- Incident Management & Command & Control System

Law Enforcement Analytics

Videonetics Law Enforcement Analytics detects abnormal/ illegal activities or anomalies, and provides intelligence to the authorities to take swift action. It provides multiple use cases, from detecting incidents of different kind of violations, fighting, rioting, illegal crowd gatherings and demonstrations, while also providing forensic investigation tools to identify the perpetrators. Combining law enforcement, traffic, forensics with Intelligent VMS enables officials to detect and investigate the incidents in a timely and efficient manner, and greatly helps in maintaining law and order. The law enforcement analytics have been found effective in automatic monitoring of correction homes and/ or prisons, to automatically detect occurrence of a riot, assault, suicide attempt etc. Videonetics pose estimation technology can be used to custom-develop other types of applications, as per user requirement.



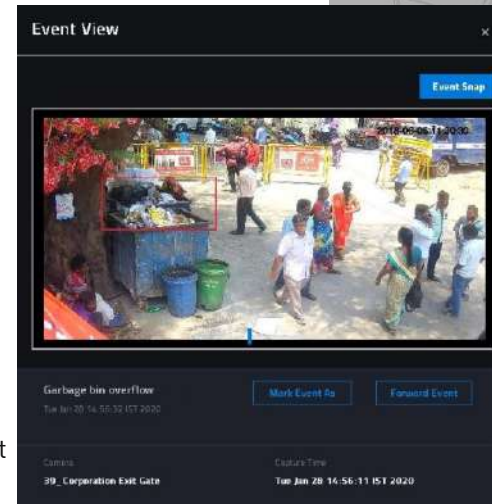
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| <ul style="list-style-type: none"> ■ Perimeter/ Fence Jumping Detection ■ Street Fight Detection ■ Riot, Aggression, Agitation & Congregation Detection ■ Possible Suicide Attempt in | <ul style="list-style-type: none"> ■ Solitary Confinement ■ Crash/ Accident Detection ■ Criminal/ Wanted Person Identification ■ Hot-listed Vehicle Detection | <ul style="list-style-type: none"> ■ Recognition of Miscreants ■ Habitual Offender Identification ■ Prohibited Zone Monitoring ■ Break-in Prediction |
|---|---|--|



Urban and Municipal Analytics

City administrations have to monitor municipal services to improve the quality of lives of citizens. Videonetics Urban and Municipal Analytics enables services such as detection of overflowing garbage bins and clearing them, maintenance of cleanliness on the roads, checking for encroachment on public places such as footpaths, detection of illegal construction, illegal hawking outside permitted areas, dumping of construction rubble, monitoring of road conditions, movement and tracking of garbage trucks, detection of graffiti and vandalism, and many more. Designed with urban planners and local self-governments in mind, the solution facilitates efficient management of services in a city or in a large residential complex.

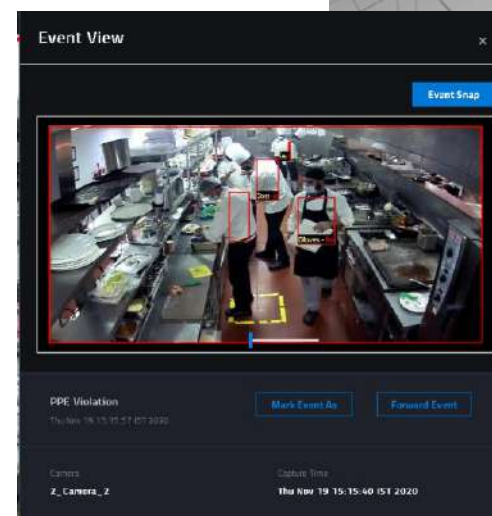
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| <ul style="list-style-type: none"> ■ Garbage Bin Detection ■ Garbage Overflow Detection ■ Garbage Bin Emptied Detection ■ Detection of Stray Animals on Road ■ Garbage Truck Tracking ■ Waste Collection Pattern | <ul style="list-style-type: none"> ■ Analysis ■ Detection of Debris/ Litter on Road ■ Encroachment Detection ■ Detection of Temporary Construction ■ Graffiti & Vandalism Detection | <ul style="list-style-type: none"> ■ Pothole Detection ■ Detection of Road Condition ■ Polluting Vehicle Detection ■ No Parking Violation Detection ■ Handcart/ Pushcart Detection ■ Illegal Hawking Detection |
|--|--|--|



Industrial Safety and Health Analytics

A major challenge businesses face is to enforce and reduce safety hazards, despite creating elaborate safety policies and procedures. Videonetics Industrial Safety & Health Analytics makes it possible for Occupational Safety and Health professionals to anticipate and control hazards arising within the factory and other service premises, that could affect workforce, workplace, surrounding communities, and the environment. Based on Artificial Intelligence and Deep Learning, it allows training of the software with users' site-specific data, and helps them detect anomalies in real time – accurately, proactively, cost-effectively.

The solution is highly adaptive and can be deployed in any industry vertical – from Food Processing to Pharma, Oil and Gas, Heavy Industries, Refineries, Automobiles, Cement and Chemicals. It also caters to the service sector including Warehousing, Transportation, Aviation, Construction, Mining, Ports and Hospitality.



- Personnel Count on Shop Floor
- Worker Behaviour Monitoring
- People Count & Occupancy
- Person Collapse/ Fall & Slip Detection
- Gesture Recognition
- Personal Protection Equipment Detection (Safety Helmet, Hat, Jacket, Vest, Boot, Hand Gloves, Safety Glasses, Harness etc.)
- Habitual Violator Detection
- Fire & Smoke Detection
- Employee/ Vehicle Entry & Exit Monitoring
- Safety Norms Violation Detection

■ Integrations

- Access Control System
- Sensor-based Perimeter Intrusion
- Terminal Automation Systems
- Thermal Cameras
- SCADA Systems
- Fire Alarm Systems
- Gate Control



Facial Analytics

Diverse demographics, in terms of facial features, skin tone etc., pose a major challenge when it comes to face detection and recognition technologies. Based on AI techniques, Videonetics Facial Analytics is a modern and robust solution that delivers accurate performance under various demographic conditions. It is well-trained with a large database of faces representing diverse demographics. It has been designed to address the needs of a range of verticals such as Law Enforcement, Hospitality, Retail, Immigration, Border Security, Cities, and more. It aims to not only improve surveillance and security, but also enhance operations with actionable intelligence. Built on modular architecture, it can be integrated with other devices such as access control, attendance management.

- Face Capture
- Face Detection with Mask
- Face Tracking & Indexing
- Facial Database Management
- Facial Displacement Correction
- Recognition
- 1:1 Verification
- 1:N Identification
- Person Re-identification
- Age Group Detection
- Gender Detection
- Emotion Detection

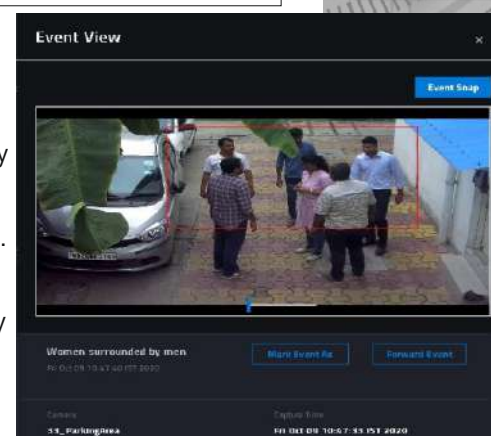
■ Integrations

- Access Control
- Time & Attendance
- Local/ National Face Databases
- Third Party Systems



Women Safety Analytics

Safety of women and crime against women are growing concerns across many cities in a number of countries, including India. Videonetics Women Safety Analytics can detect unwanted incidents, or series of actions, involving women. For instance, it can generate an alert about a single woman surrounded by men, in certain areas, or during a certain time band, thereby providing an early warning of potential abuse. Law enforcement agencies can get insights from series of events such as day-to-day alerts, to prepare a profile of their city, in order to identify such hotspots. Incidents of chain or purse snatching can be detected based on the sequence of events that typically occur during such incidents. The solution detects the anomalies in a scene and generates timely alerts to help catch the perpetrators. Deployment of these technologies can bring a sense of security among women and their families.



- Detection of a Woman Surrounded by Men
- Count of Men vs Women in the Scene
- Chain/ Purse Snatching Detection
- Detection of a Woman in Distress (Emotion)
- Detection of a Lone Woman at Night
- Gesture-based SOS Recognition



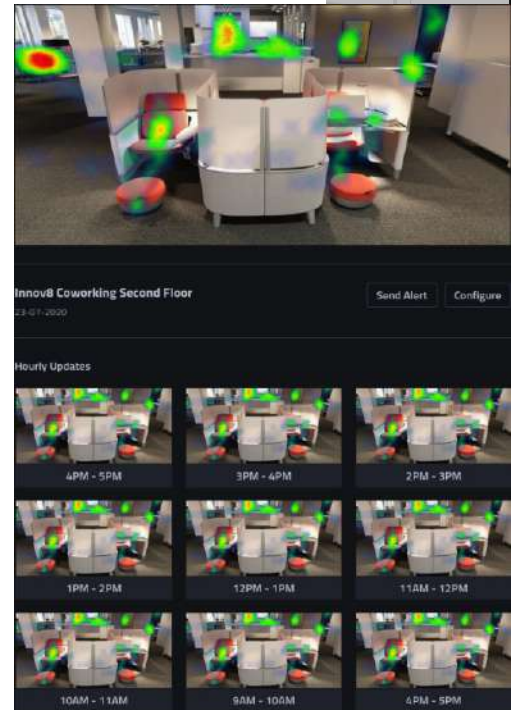
Retail Analytics

Retail businesses constantly look for opportunities to enhance their operational excellence, customer satisfaction, and hence return on investment. It provides true business intelligence and generates several statistical reports such as footfall count, customer concentration, queue length and wait time analysis, customer dwell time, heat maps, customer path analysis data, and more.

The solution also helps in customer profiling by detecting customer emotions, age and gender distribution, distribution of customers across multiple stores, to get insights into buying patterns and performance drivers for the business.

Pilferage and theft prevention is an important key performance indicator of store operations and profitability. The solution offers multiple use cases to detect incidents of shop lifting, pilferage, unauthorised entry beyond store operational hours, and tracking of known shoplifters across a chain of stores, using powerful facial analytics.

- Entry/ Exit & Footfall Count
- Heatmap Generation
- Merchandising Monitoring
- Video Synopsis
- Intrusion Detection
- Customer Movement & Dominant Path Analysis
- Dead Zone Identification
- Queue Management
- Monitoring of Service Time at POS
- Monitoring of Social Distancing in a Queue
- Face Mask Violation Detection
- Recognition & Tracking of Known Shoplifter

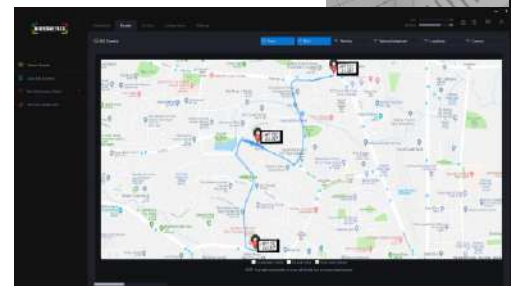


Tracking Analytics

High security areas such as defence establishments, critical infrastructure, refineries, etc. have a great need of tracking people movement in their premises. Videonetics Tracking Analytics is the ideal solution for such establishments.

By enabling PTZ tracking on perimeter tracks, it ensures that any intruding person can be captured in a close-up view, and also generates alerts at the command and control centre. Similarly, objects, people or vehicles can be tracked in a camera field of view, or they can be tracked across multiple cameras, based on attributes of the intruder, location and time.

- People & Object Tracking
- Colour & Attribute-Based Tracking
- Auto PTZ Tracking
- Fixed Camera to PTZ Handoff
- ANPR-based Vehicle Tracking
- Person Tracking Based on Face Recognition
- Multi-camera Person Tracking



■ Integrations

- Perimeter Intrusion Detection Systems
- Access Control Systems
- Radar & LiDAR Systems
- Guard Tour Monitoring Systems
- PA Systems

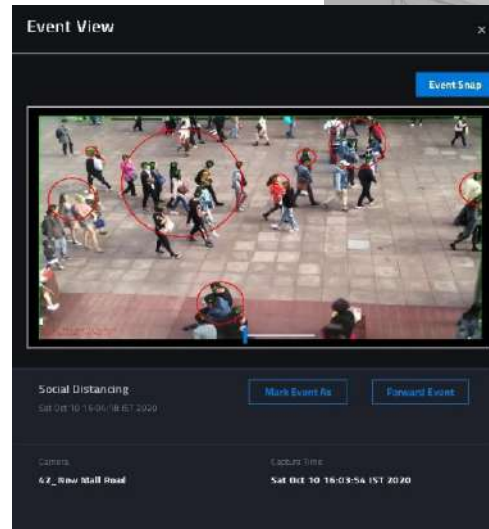


Pandemic Management Analytics

The COVID-19 pandemic has changed the world. People and businesses have to reconcile to the 'new normal' during and after the pandemic period. Keeping a pandemic under control requires strict adherence to epidemic control norms such as wearing masks, maintaining social or physical distancing, and detecting crowd formation. Videonetics Pandemic Management Analytics provides multiple use cases and serves as an efficient decision support system for authorities in identifying and concentrating on areas where people are violating the norms. Videonetics social or physical distancing technology is efficient and more effective, based on the accurate distance measured from head to head of persons, not just body or leg distance.

Businesses in sectors such as hospitality, healthcare, food processing and pharma can deploy the solution to automatically check if their employees are wearing the mandatory Personal Protective Equipment (PPE) such as aprons, masks, caps, hand gloves, face shields. The solution can generate alerts in case of violations.

- Social Distancing Monitoring
- Mask/ No-Mask Detection
- Personal Protection Equipment Detection (Head Cover, Mask, Uniform Detection)
- Queue Management
- Detection of Anomaly in Body Temperature
- Detection of Crowd Formation in Violation of Social Distancing Norms
- Safety Heatmap Generation
- Pandemic Violation Dashboard



Forensic Investigation and Smart Search Analytics

Today, forensic investigations, including compilation of robust video evidence, is regarded as the most scientific and effective way of investigating and building a case. Videonetics Forensic Investigation and Smart Search Analytics comes with powerful and intuitive in-built tools. It enables investigation into an incident by identifying suspects using attributes such as face, and tracking based on attire, accessories and gender. A particular activity can be easily pinpointed in a long evidence video, and the storyline of events created, through the use of video summarisation tool, or various smart video search options.



- Attribute Search – Attire Type (Shirt, Pant, Saree, Salwar-Kameez), Colour etc.
- Face Detection, Identification & Recognition
- Thumbnail Generation & Detection of Time Segment & Location
- Event Search
- Speed & Direction Detection
- Video Summarisation
- Who left that Object with Person Identification



Key Highlights

- **Based on Artificial Intelligence:** Videonetics AI-based Video Analytics is enabled with a collection of indigenously developed AI techniques, based on advanced image and video processing, computer vision and pattern recognition. Leveraging our numerous proprietary models, AI and underlying deep neural networks (DNNs), enables the platform to efficiently compute automatic object/ pattern detection, multi-level classification, pose estimation, semantic segmentation etc. These models have been generated with a wide range of real-life visual datasets, to provide unparalleled accuracy, using optimal computing bandwidth suitable for various application domains.
- **Continuous Self-learning Approach:** Proprietary self-configure, self-calibrate and self-learning approach provides automatic continuous learning capability from the field data, and hence enhanced detection, classification and recognition accuracy over time.
- **Camera Agnostic:** Agnostic to any make and model of camera. It is built on robust technology and can work with any video data, whether real-time or archived, and generated from any source.
- **OS Agnostic:** Works in Windows, Linux, Unix, macOS.
- **Unparalleled Channel Support:** More channels per server (highly optimised for CPU and GPU), to ensure the lowest total cost of ownership (TCO) and better ROI.
- **Unprecedented Scalability:** Highly scalable software architecture. Highly optimised AI codebase that supports multi-threaded processing of the algorithms, and multiple analytics functions to run in parallel, in each camera in the surveillance system. The footprint is very small with reduced computational and memory requirement, because of its indigenous design and innovative architecture.
- **Integrated with Intelligent VMS:** Integrated with Videonetics enterprise-class Intelligent Video Management Software (IVMS). This homogenous, unified video computing architecture helps both the VMS and VA platforms to share common computing, data path and IT infrastructure resources, with efficient utilisation of compute and memory resources. Resulting in a highly optimised cost of IT infrastructure, hence lower total cost of ownership (TCO), and higher ROI. It is also extremely important for ease of maintenance after deployment.
- **Deployment Flexibility:** Flexible deployment options across the edge, on-premise, or on-cloud. Deployable in hybrid and fog computing architecture, hence adaptable to 'Video Analytics as a Service' computing paradigm.
- **Software Interface:** Easy-to-use, intuitive and feature-rich desktop, handheld and web user interface.
- **Alert Management:** Ability to prioritise alerts according to criticality. The automatic alert manager built into the platform notifies the operators instantly by different alert mechanisms such as email, SMS, WhatsApp, chat etc. The alert handling mechanism can also trigger other devices such as Public Address System, audio-visual annunciators etc. A rich API is available to integrate with any other devices, as per user requirement.



- **Intelligent Search:** Intelligent video and event search features to expedite investigations.
- **Statistical Reports and Visualisation Dashboard:** Various forms of statistical reports of the events can be automatically generated using analytics-based tools. These reports can be viewed in dashboards for easy understanding, and to serve as a decision support tool.
- **Rich API:** Pre-integrated with Videonetics in-house enterprise-class VMS, yet a rich API is also available to integrate the VA platform with an existing surveillance installation, or a third-party VMS, as per the choice of the user.
- **Field-proven Technology:** The AI-based analytics framework and the applications are field-tested under a wide range of environmental and lighting conditions. Proven to work more reliably in high population density conditions, compared to other competing solutions. Field-proven with real-life deployments across various domains, in more than 100 cities, enterprises and other critical installations.



Making the world
a safer, smarter, happier place.

Videonetics's Unified Video Computing Platform™ helps you make sense of surveillance, by providing you with an end-to-end solution for a wide range of applications. The platform is powered by our Artificial Intelligence and Deep Learning engine, which is trained on humongous data sets, making our solutions incredibly robust and smart. All our products and solutions are integrated yet modular, ONVIF compliant, OS and hardware agnostic, scalable and interoperable.

Videonetics has been ranked #1 Video Management Software provider in India, and among the top 5 in Asia (IHS/Informa Tech Research). We remain driven by innovation, and committed to making the world a safer, smarter, happier place.

Providing an end-to-end solution for a wide range of applications



Intelligent
VMS



AI Enabled
Video Analytics



Facial
Recognition



Intelligent Traffic
Management System



Video Command &
Control Centre



VCPaaS™
Video Computing
Platform as a Service

Technology leader across verticals, in different parts of the world



CITIES &
NATION



AVIATION &
TRANSPORTATION



COMMERCIAL
BUILDINGS



INDUSTRIAL



FINANCIAL
& LEGAL



EDUCATION



CRITICAL
INFRASTRUCTURE



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