videonetics

Videonetics AI-Enabled Video Analytics

Version 2.0

Deriving actionable intelligence
through data-driven insights.

What are video analytics

Video analytics technology analyses the content in images or video frames to extract actionable information related to the presence and behavioural patterns of different objects, like people, vehicles, objects, and animals, and transform them into intelligent data to assist users in making informed decisions. The technology can be used for the protection of assets, detecting trespassing of people and vehicles, checking compliance to safety norms in enterprises and construction sites, analysing traffic patterns, detecting violations of traffic rules and trends, monitoring various activities related to waste management, and ensuring better services to humankind in general.

Since their very dawn, video analytics have been considered as a solution to assist people by providing security to infrastructures with a powerful means to detect and identify intruders, track people or objects, and produce an alarm on detecting anomalies.

The WHY?

Dealing with humongous video data is always challenging, especially when it involves critical information. Reviewing hours of surveillance video to identify incidents pertinent to what you are looking for by human observation is not only timeconsuming and costly but also impractical due to human inattentiveness and fatigue when given the task of watching video footage manually for long.

Video analytics will increase the efficiency of your security monitoring process and decrease the workload on security and management staff by automatically analysing the video by software and generating notifications to draw your attention.

The HOW?

The emergence of Artificial Intelligence reignited the industry of video surveillance. The AI software engines get trained on real-world data for detecting objects and activities in the scene. The engines further integrate the information to provide data insight for various purposes,e.g., ensuring safety and security. The AI engine can identify patterns embedded into the images of the types of objects visible once trained on image metadata.

When used along with a robust Video Management System (VMS), informed decisions can be made based on the metadata generated by video analytics engines and correlating them with video and other sensory data.

Our AI & DL framework

Contrary to pixel-based image processing technology, Videonetics video processing applications use AI - Deep Learning framework to detect & classify objects and activities in a scene accurately. The applications offered by Videonetics can be deployed across various verticals like Smart Cities, Healthcare, Industrial houses, Hospitality industries, Gated communities, Transportation, and logistics, to name a few.

Versatile, futuristic, & unmatched precision

Our indigenously developed AI & DL-based 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 the interconnection of these engines and hence suitable for domain-specific customised video analytics application development.

Unified video management platform

Videonetics comes with its AI-powered Video Management System, a one-stop, modular video management solution pre-integrated with AI & DL framework that opens a whole new dimension to holistic situational awareness and generates opulent actionable information.

Videonetics VMS gives the power to simplify the complexities of handling vast amounts of video data, metadata, and video computing services in a unified and homogenous software architecture platform that avoids data replication and ensures data integrity and interoperability. Challenges faced by different enterprises or users are not the same, therefore Videonetics VMS provides flexibility to personalize the system as per user requirements.

Fog computing

Our VA engine framework is a perfect fit for Video Internet of Things (VIoT) applications, with its fog computing capabilities, in which computing load is distributed judiciously across the 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).

We Look Deeper.

100+ use cases for diverse applications

Field-proven in diverse environments and challenging conditions, our suite of video analytics is the reliable choice for safe and smart Cities, Aviation, Mass Transportation, Small to Large Enterprises, Critical Infrastructures, Retail, Defence, Law Enforcement, BFSI, Educational institutions, and Healthcare, to name a few. With the power of AI, our framework offers over a hundred state-of-the-art use cases broadly categorized under the below segments. The 100+ use cases for various segments are grouped under clusters as below.

- People analytics
- Object analytics
- Crowd analytics
- Vehicle analytics
- Traffic enforcement analytics
- Highway traffic analytics
- Law enforcement analytics
- Industrial safety & health analytics
- Face recognition analytics
- Women safety analytics
- Retail analytics
- Tracking analytics
- Pandemic management analytics
- Forensic investigation & smart search analytics

People analytics

People analytics detects the presence of people in a given region of interest, classifies their gestures, and attires and tracks their movements across video frames. Based on various rules, different use cases are defined. It can detect the presence of a person in a marked area, the dwell time, whether a person has fallen on the ground, and automatically detects the type of attire of a person or some specific gesture like waving hands, crawling etc.

- Intrusion/ Trespassing
- People tracking & trajectory
- Line crossing
- Perimeter/ Fence jumping
- People count
- Occupancy
- Entry/ Exit count
- Gesture detection
- Tailgating/ Piggybacking
- Person collapses/ Fall & slips

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Detects gestures, attire and tracks movements.

Object analytics

Videonetics AI engines get trained in-house to detect and classify many object types, including those worn or carried by people like gloves, shoes, hats, or bags. You can use these applications to safeguard your assets or to identify bags or backpacks lying unattended on the floor or tabletops. The AI engine can detect and classify people's gender, vehicle type, animals, etc., in the scene and track them. The data is stored and correlated with the relevant video for later search and forensic analysis.

- Moving object detection
- Object classification & counting
- Camera sabotage detection
- Unattended object detection
- Who left that object
- Theft detection
- Object tampering
- Attribute analysis & search

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Recognises suspicious or unidentified items.

Crowd analytics

Videonetics' crowd monitoring suit of analytics can be used to monitor the collective behaviour of people in public places or restricted areas, count the footfall, detect overgrown queues in front of service counters and the formation of a mob beyond a threshold. Detection of the wait time of a person in the queue could lead to estimating the efficiency of the service counters. The density of the crowd could be displayed in the form of a heatmap.

- Crowd formation & estimation detection
- Crowd dispersion detection
- Crowd statistics & heatmap
- Queue length detection
- Queue limit exceeds detection
- Wait time in a queue
- Social distancing in a queue

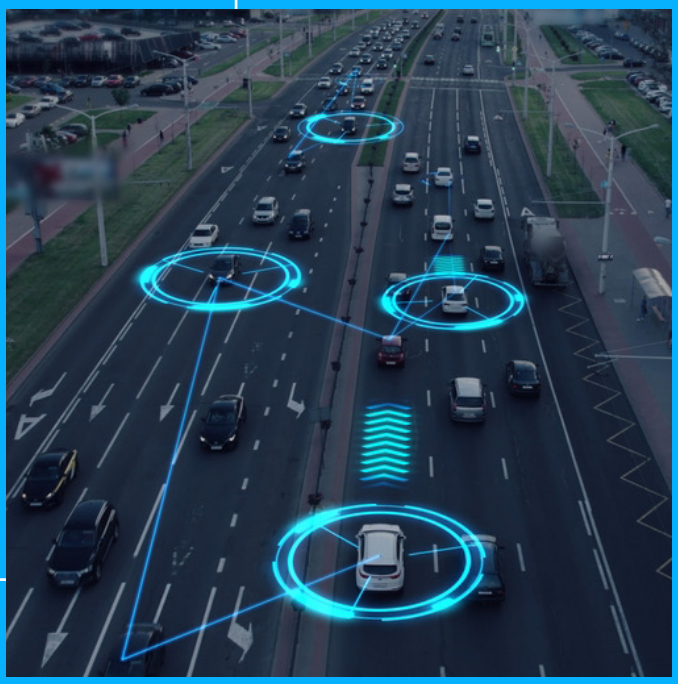
Monitors crowds, footfall, queues, and density efficiently.

Vehicle analytics

Identifying vehicles and monitoring their behaviour on public roads is essential to public safety and security. Be it the entry-exit gates to facilities or flowing traffic, you can use these applications to identify the vehicles by their License plate (ALPR) & other attributes and search for the appearance of any specific vehicle in the scene. Detecting parked vehicles and congestion or estimating the traffic flow is part of the Videonetics Vehicle analytics suit.

- Vehicle classification & counting
- Traffic volume estimation
- Automated licence plate recognition
- Missing/Non-standard licence plate detection
- Vehicle moving in the wrong direction
- Vehicle making a prohibited turn
- Driver not wearing seat-belt
- Vehicle changing lanes
- Two-wheeler riders & pillions not wearing helmets
- Vehicle make identification
- Congestion detection
- Parking violation detection
- Accident detection

and many more...



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Enhances road safety and monitors public behaviour.

Law enforcement analytics

Our suite of video analytics provides multiple use cases that help detect abnormal activities and provide intelligence to law enforcement agencies to take swift action from detecting incidents of different kinds of violations, fighting, rioting, illegal crowd gatherings, and demonstrations, while also providing forensic investigation tools to identify the perpetrators. Combining law enforcement, traffic, and forensics with VMS enables officials to detect and investigate incidents timely and efficiently. Law enforcement analytics have been found effective in monitoring homes and prisons to automatically detect the occurrence of a riot, assault, suicide attempt etc.

- Perimeter/ Fence jumping detection
- Street fight detection
- Riot, aggression, agitation & congregation detection
- Possible suicide attempt in solitary confinement
- Crash/ Accident detection
- Criminal/ Wanted person identification
- Hot-listed vehicle detection
- Recognition of miscreants
- Habitual offender identification
- Prohibited zone monitoring

Detects violations and aids law enforcement.

Urban and municipal analytics

City administrations have to monitor municipal services to improve the quality of lives of citizens. Our urban and municipal analytics use cases enable services such as the detection of overflowing garbage bins and their clearance, maintenance of cleanliness on the roads, checking for encroachment on public places such as footpaths, detection of illegal construction, dumping of construction rubble, monitoring of road conditions, movement and tracking of garbage trucks, detection of graffiti and vandalism and many more. Designed for urban planners and local governing bodies the solution facilitates efficient management of services in a city or a large residential complex.

- Garbage bin detection
- Garbage overflow detection
- Garbage bin emptied detection
- Detection of stray animals on the road
- No parking violation detection
- Handcart/ Pushcart detection
- Detection of debris/ litter on the road
- Graffiti & vandalism detection

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Ensures safe, hygienic and clean cities.

Industrial safety and health analytics

Businesses today face the critical challenge of enforcing safety measures and reducing hazards despite creating elaborate policies and procedures. Our industrial safety & health Analytics use cases make it possible for safety and health professionals to anticipate and control hazards arising within the workplaces that could affect the workforce, surrounding communities, and the environment. Based on AI and Deep Learning, the framework allows training of analytics engine with users' site-specific data that helps them detect anomalies in real-time accurately, proactively, and 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 sectors like Warehousing, Transportation, Aviation, Construction, Mining, Ports and Hospitality.

- Personnel count on the shop floor
- Forklift safe movement detection
- People count and occupancy
- Person collapse/ Fall & slip detection
- Fire & smoke detection
- Employee/Vehicle entry & exit monitoring
- Gesture recognition
- Personal protection equipment detection

Increases safety with real-time hazard detection.

Face analytics

Diverse demographics of facial features, skin tone, etc., pose a complex challenge 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. Detect People across multiple cameras, Integrate with Visitor management system and Attendance Monitoring system. It is well-trained with a massive database of faces representing diverse demographics to address the needs of numerous verticals such as Law Enforcement, Hospitality, Retail, Immigration, Border Security, Cities and more.

- Face detection & recognition
- Face detection with a mask
- Face tracking & indexing
- Face database management
- Facial displacement correction
- 1:N, N:1 verification
- Age group detection
- Gender detection

Provides accurate, diverse, and integrated solutions.

Women safety analytics

The safety of women and crime against women are growing concerns across many cities in several countries. Videonetics Women Safety Analytics can detect unwanted incidents, or series of actions, involving women. For instance, it can generate an alert when a lone woman is surrounded by men, in certain areas, or during a particular time of the day, thereby providing an early warning of potential abuse. Law enforcement agencies can mark such places to prepare for appropriate deterrence. The solution detects anomalies in a scene and generates timely alerts to help catch the perpetrators.

- Detection of a woman surrounded by men
- Chain/ Purse snatching detection
- Gesture-based SOS recognition
- Count of men vs women in the scene
- Detection of a lone woman at night.

Detects and alerts on potential abuse situations.

Retail analytics

Retail businesses constantly explore opportunities to enhance their operational excellence and customer satisfaction. Our range of video analytics designed for retail environments provides business intelligence and statistical information, clubbed with Videonetics People and Facial recognition analytics, you can recognize frequent visitors, and known miscreants, monitor service queues, and generate a heatmap to get situational awareness and take action to increase efficiency and performance of a retail outlet. The solution also helps in customer profiling by detecting customer emotions, age, gender, and distribution of customers across multiple stores to get insights into buying patterns and performance drivers for the business. Pilferage and theft prevention are key performance indicators of store operations and profitability. The solution offers multiple use cases to detect shoplifting, pilferage, unauthorised entry beyond store operational hours, and tracking of known shoplifters across the chain of stores using powerful facial analytics.

- Entry/Exit & footfall count
- Heatmap generation
- Video synopsis
- Intrusion detection
- Monitoring of social distancing in a queue
- Face mask violation detection
- Recognition & tracking of known shoplifters
- Dead zone identification
- Queue management

Improves operations, security and customer insights.

Tracking analytics

High-security areas such as defence establishments, critical infrastructure, refineries, etc., must track people's movement on their premises. Videonetics AI-enabled video analytics is the ideal solution for such establishments. Enabling PTZ tracking on perimeter tracks ensures that the command-and-control center is alerted for an intruding person captured in a close-up view. Similarly, objects, people, and vehicles get tracked in the camera view or across multiple cameras based on attributes of the intruder, location and time.

- People & object tracking
- Attribute-based tracking
- Auto PTZ tracking
- Person tracking based on face recognition
- Multi-camera person tracking
- Fixed camera to PTZ handoff
- ANPR-based vehicle tracking

Facilitates surveillance in sensitive areas.

Pandemic management analytics

People and businesses must 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 AI-enabled video 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. Our 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 such as hospitality, healthcare, food processing, and pharma can deploy the solution to automatically check if their employees wear mandatory Personal Protective Equipment (PPE) such as aprons, masks, caps, hand gloves, and face shields. The solution can generate alerts in case of violations.

- Social distancing monitoring
- Mask/ No-mask detection
- Personal protection equipment detection (Headcover, mask, uniform detection)
- Safety heatmap generation
- Queue management
- Detection of crowd formation in violation of social distancing norms

Efficiently regulates post-pandemic norms.

Forensic investigation and smart search analytics

Today, forensic investigation, including the compilation of robust video evidence, is regarded as the most scientific and effective method of investigating and constructing a case. Our 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, attire, accessories, and gender. Video summarisation and other search tools help locate any incident from long video evidence and create a storyline.

- Attribute search – attire (dress), gender, child etc.
- Face detection, identification & recognition
- Video summarisation
- Who left the object with the person's identification.
- Thumbnail generation and detection of time segment and location
- Event search

Aids forensic investigation and effectively helps track suspects.

Key highlights

Powered by 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 technology. Leveraging our numerous proprietary models, AI and underlying deep neural networks (DNNs), enables the platform for efficient 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 and macOS.

Unparallel 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 multithreaded 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 requirements, because of its indigenous design and innovative architecture.

Integrated with VMS:
Integrated with Videonetics enterprise-class Video Management Software (VMS). 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. This results 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.

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 the Public Address System, audio-visual annunciators etc. A rich API is available to integrate with any other devices, as per user requirements.

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.

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.

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