Videonetics Face Recognition System
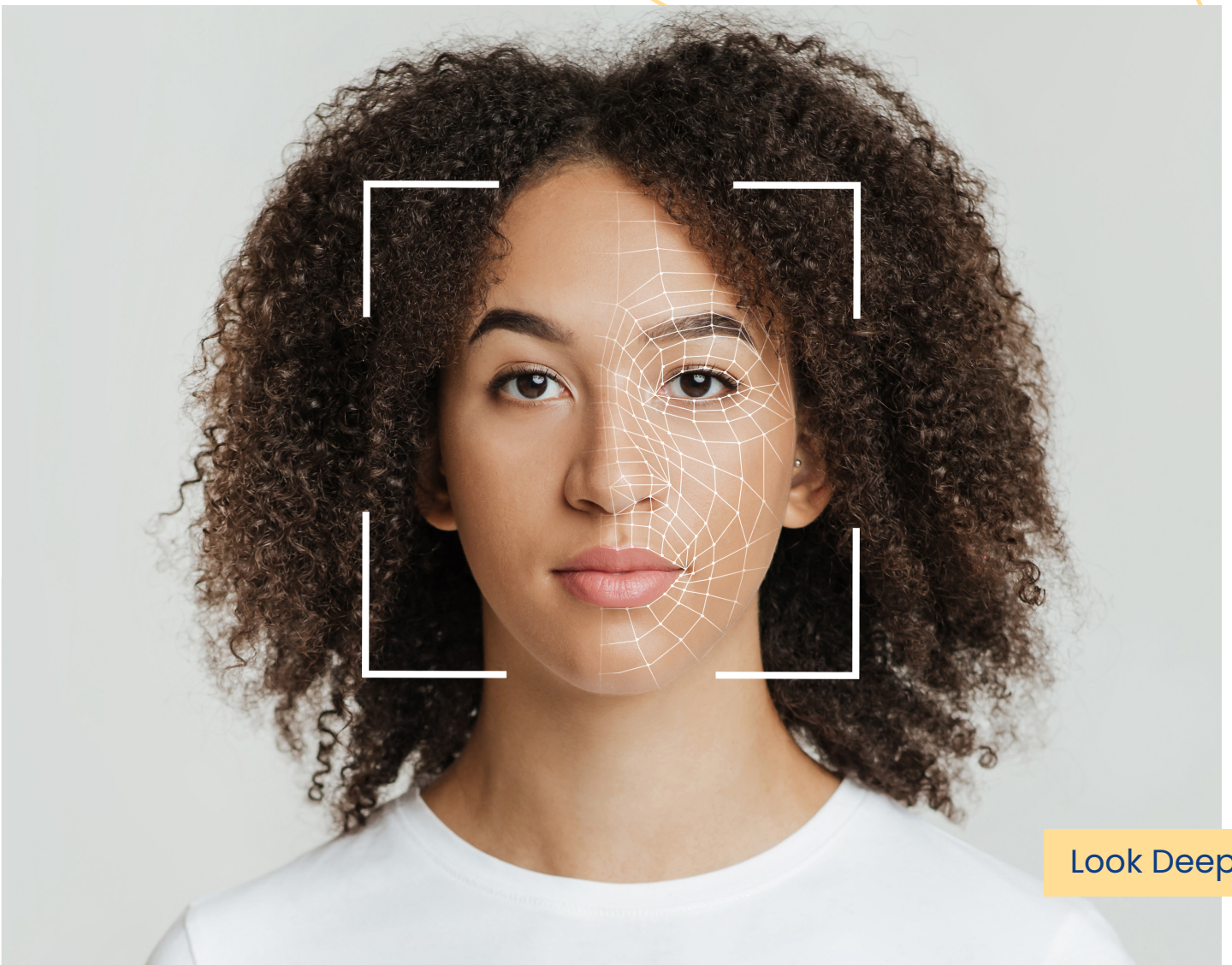## Version 2.0

AI precision for seamless and scalable face recognition solutions

videonetics
Look Deeper

Look Deeper

AI & Deep learning powered

Face Recognition System

Videonetics Face Recognition System (FRS), powered by a rich set of Artificial Intelligence (AI) based algorithms, is versatile, intelligent, and possesses extreme computational efficiency. The software is flexible & modular, suitable for deployment in both on-premises and on-cloud infrastructure with unlimited scalability. Due to the modular nature of the system, the underlying modules could be distributed across multiple edge or computing devices for flexible deployment and operational excellence. The simple web-based user interface is responsive and versatile.


01

Our solution detects the person of interest.

The FRS that fits all needs

The system has been designed to cater to the demands of various domains.

Law enforcement

FRS is probably the most credible tool for law enforcement agencies to conduct investigations. Known miscreants could be identified in public places and tracked in real-time. It is extremely useful at airports, entry-exit gates of secured establishments, and large public gatherings, to identify & track people and restrict entry of suspects.
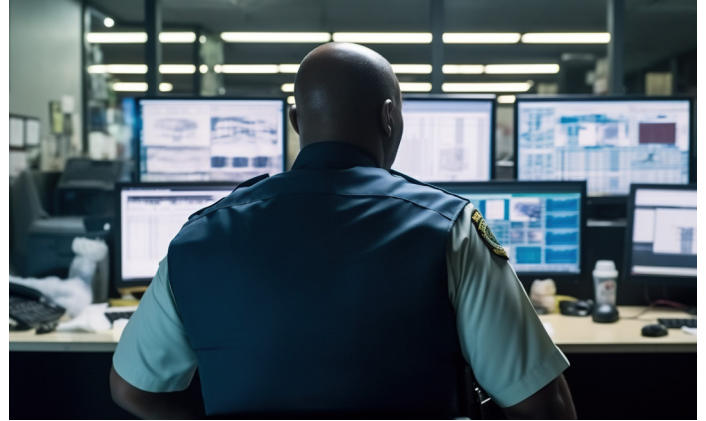
Education

From automating attendance to detecting the presence of students and teachers in the classrooms, FRS can help educational institutions become safer and smarter. It can also help identify inattentive students by analysing facial expressions and giving crucial feedback resulting in more effective teaching methods.

Retail

Notifications can be sent to the concerned store manager when a frequent customer visits. Also, the emotion detection engine can assess customer moods while they wait in queues or interact with the staff, helping operations to make necessary adjustments to heighten customer experience. Nonetheless, the FRS application can identify known shoplifters when integrated with such databases of people.

02

Hospitality

Management of hotels can use the FRS to monitor guests in common areas & identify people not registered as guests or marked by security agencies as known criminals. FRS could be a cornerstone in ensuring the security and safety of the hospitality industry by identifying registered guests from unregistered visitors. It can help management take prompt action by alerting the presence of criminal/repeat offenders. The system can also enhance the guest experience by providing a touchless (yet secure) access control using face ID. It can also provide a customized environment for frequent visitors by recognizing their usage patterns.


Casinos & gaming

Customer profiling can be done by identifying their patterns of engaging themselves in various games across a timeline, other than tracking their movements in the premise. Known offenders can be identified and handled accordingly by the management.

03

Operational efficiency across diverse domains.

For real-time or post-event investigation

Online face recognition for live monitoring

Online face recognition (live monitoring) works on instantaneous video feeds from multiple cameras, identifying people of interest by continuously comparing the captured faces with a database of people. The system is designed in a way that u hold is reached.
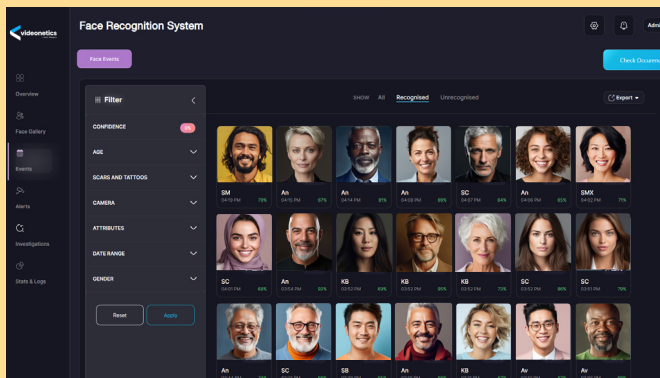

Offline face recognition for post-event investigations

Offline face recognition helps authorities to investigate incidents to identify the faces of suspects from recorded video clips, group photographs, and images and run the comparison with the stored database of frequent offenders and miscreants. Given a probe image and a video clip, it finds all the occurrences of the probe image in the recorded video files above the confidence factor. Users can configure and extract the results of top matches to report, coupled with desired confidence factors.

04

Always assists authorities.
Doesn't matter online or offline.
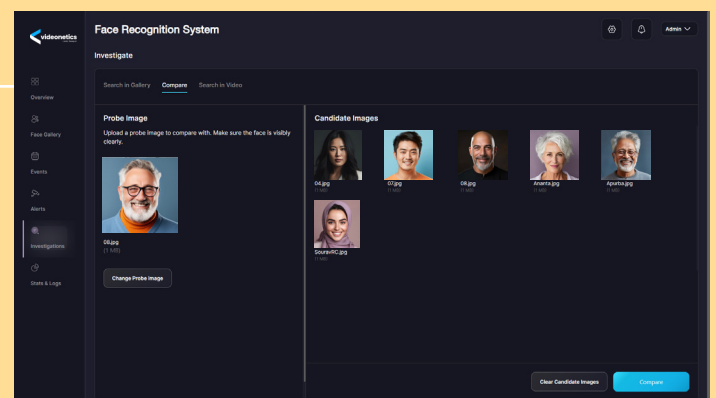
Trained for diversity
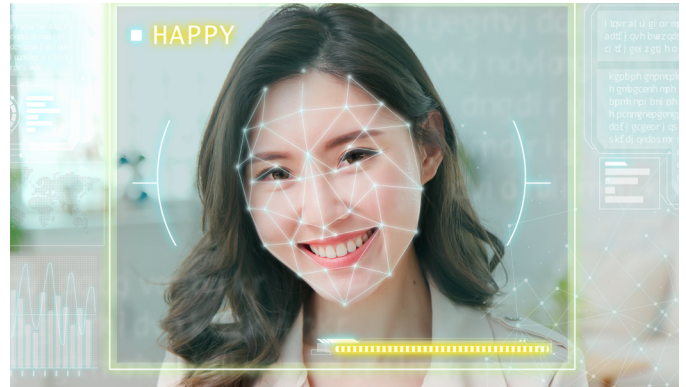
Deep learning

The AI and Deep Learning-based system is trained on more than 100 million faces including standard benchmark face data and database collected from various geographic regions, different age groups, and ethnicities to represent characteristics of faces across the diverse world population.

Face expressions

The complex algorithms are trained to identify common facial expressions like a smile or a frown quite efficiently. This feature not only helps law enforcement agencies to identify probable suspects but also hospitality & retail sectors to monitor and enhance customer experience.

Happy. Sad. Sick. Smile. Our solution reads your mood.

Facial features & worn gear

The AI and DL-based system is robust enough to detect and identify faces with face surface area as low as 30 x 30 pixels, under various lighting conditions, or even partially occluded faces. Videonetics FRS supports yaw, pitch, and roll displacement corrections to detect faces from different angles. It is also reasonably agnostic to the following facial attributes – age, sex, demography, facial expression, masked face, head pose, facial cosmetics, head covering, etc.

05

Easy deployment
& maintenance

Distributed and scalable

Videonetics FRS is fully modular. The overall computing, starting from capturing video to recognising faces, is distributed across multiple computing engines called nodes. Depending on configurations, single server hardware can accommodate one or more such nodes. On the other hand, the nodes can be distributed across multiple computing hardware. Customers can choose to deploy the system over a centralised or distributed architecture.


System redundancy

Servers assigned for managing video data can support 1:1, N:1, N: N, and N:0 redundancies. In the case of N:0, no server hardware remains idle to take over the task of a failed server. Instead, the computing load of one or more failed servers is distributed across all other active servers based on their spare computing power, thus ensuring maximum utilization of resources yet keeping the compute load within healthy limits.
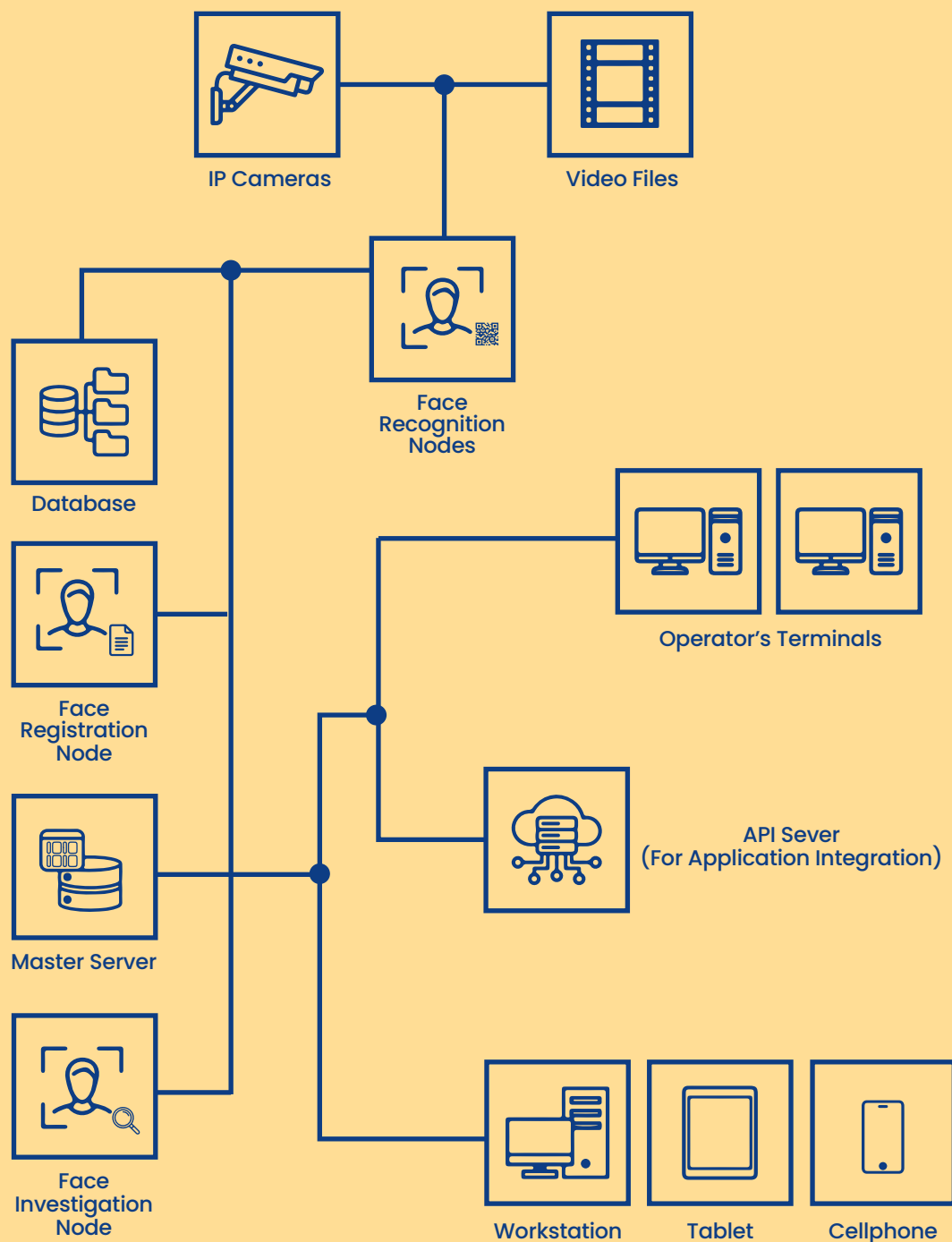

Face registration

Videonetics FRS allows the enrolment of faces for individuals one by one or in bulk. For every person, one can register multiple images. Users can also use mobile phone cameras for this application. The software also supports auto registration, where faces are automatically detected in live camera view and get registered by the system without any operator intervention. The system conforms to ISO/ IEC 19794- 5:2005(E) face image data standards.
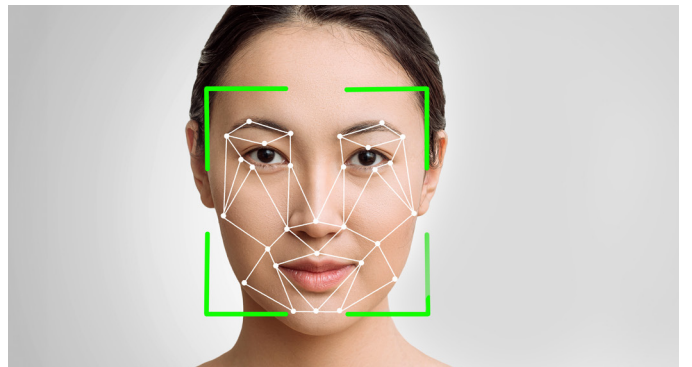
State-of-the-art architecture
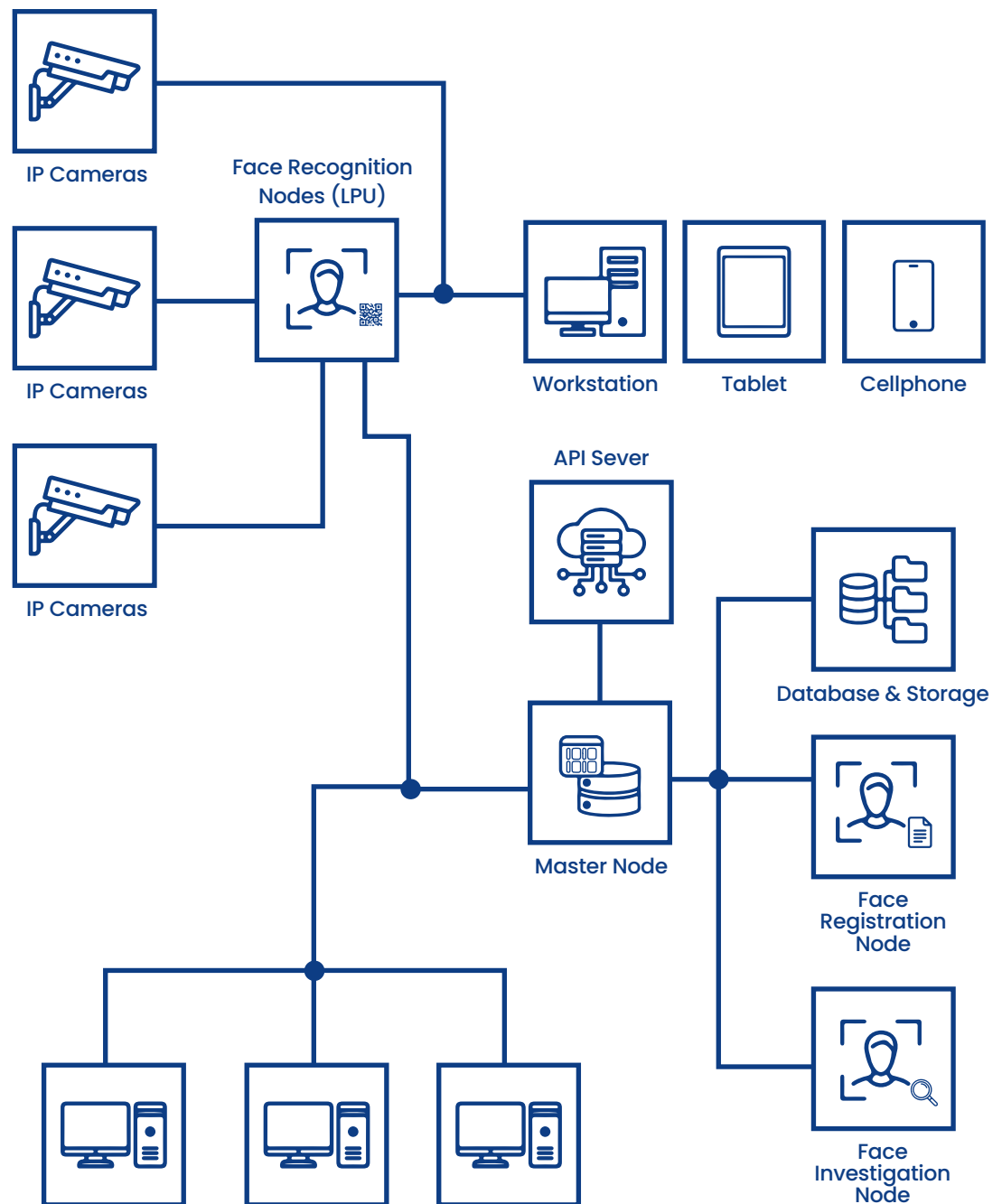= unwavering performance.

Centralised architecture

Multiple servers are installed in a central command center. The video source is connected to the server directly, either over a network or using the file system. In a typical installation, a single server accommodates multiple face recognition nodes, each capable of handling a single video source, and there can be more such servers, giving rise to unparalleled scalability for face capture and recognition.

IP Cameras

Video Files

Face Recognition Nodes

Database

Operator's Terminals

Face Registration Node

API Sever
(For Application Integration)

Master Server

Face Investigation Node

Workstation

Tablet

Cellphone

Centralised deployment
(server nodes in data centre)

Flexible deployment and architecture

In a distributed architecture, the face recognition nodes can be installed in multiple computing devices that are installed across geographically separate regions. This includes an Access Control System, POS terminals, or any dedicated Local Processing Unit (LPU). The other modules of the software are hosted in central servers or cloud infrastructure.

IP Cameras

Face Recognition Nodes (LPU)

IP Cameras

IP Cameras

Workstation

Tablet

Cellphone

API Sever

Master Node

Database & Storage

Face Registration Node

Face Investigation Node

Distributed deployment (Local Processing Unit acts as Face Recognition Node)

Cyber secured

Data safety, security, privacy

Data encryption and its transmission over secured channels ensure data security at rest, on the move or when in use. Our trained AI engines are also encrypted to protect them from tampering. Videonetics FRS handles cybersecurity threats with multi-pronged security measures to ensure user data privacy, security, and integrity when data is at rest, in motion or in use.

Tested for vulnerabilities

Videonetics software applications are certified for OWASP compliance, and its client applications are continuously tested for any vulnerability. All communications amongst different servers, and between servers and clients take place over encrypted channels and are authenticated by exchange of certificates.

Our philosophy

Secure Development

Secure Deployment

Operational Endurance

Rapid Response

Prioritising data safety at every step.

09

Other
highlights

Fast and responsive:
Videonetics FRS uses fast and computationally efficient CNN-based feature extraction techniques for the recognition and matching of faces. The algorithms are ported both in CPU and GPU architectures. Videonetics FRS can recognise a face from a million faces in less than 2 seconds, and less than 10 seconds from 100 million faces (considering necessary server and infrastructure pre-requisites are met).

Face duplication:
It supports the automatic detection and identification of multiple entries of the same person in the database while preventing duplicate entries.

Unlimited database:
The system can handle an unlimited database of unique faces; a group of images for each person can be tagged in a single database.

Face comparison:
1:1 search comparison of two faces and produce similarity score. 1:N search comparison of a probe image with a set of input search images to produce similarity measures (Confidence Factor) against each search image.

Anti-spoofing:
It supports a liveliness test to defeat attempts at impersonation by automatically detecting faces that are captured from placards, digital media (e.g. cell phones) etc. as opposed to faces that are captured live from cameras.
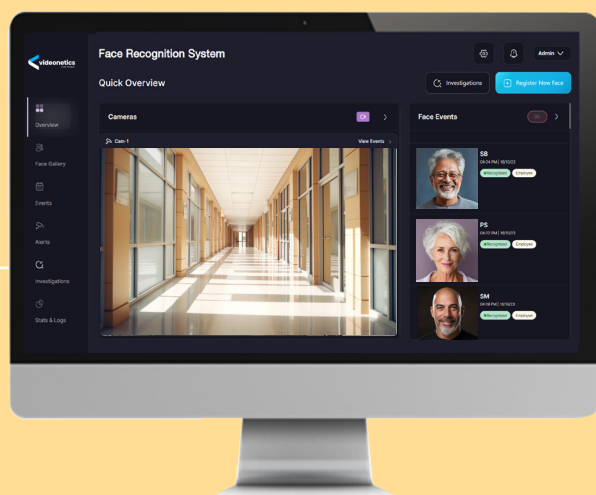
Live alerts and past occurrences:
It displays the faces which are detected live in the surveillance camera. The operator can probe a face and view the past occurrence of the same person across all the connected cameras in the network.

Watch-list and notification:
It supports the creation of multiple watch-lists based on categories of people (e.g. employees, suppliers, guests, etc.), and creates specific notification rules on each of the watch-lists. The notifications can be sent over SMS, email etc. to the designated recipients.

Health monitoring:
Videonetics FRS has in-built health status monitoring to monitor the health of cameras, servers and other components in the system.

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Key specifications

OS & hardware supported	• Server OS: Linux • Containerization and Virtual machine supported • Database: MongoDB • Supports Commercially Off-The-Shelf (COTS) hardware and storage • Firefox, Chrome, Safari, Internet Explorer, Microsoft Edge, Opera • ONVIF-conformant for profiles S, G, T and M • NVIDIA, Intel HD Graphics and QuickSync hardware decoders. • Android and iOS Mobile Apps
Deployment	• Single site on premise, on Cloud, Hybrid • Multi-site with Central Command Centre at Cloud/Data center/Hybrid
Security and encryption	• Multi-factor authentication • Integration with multiple directory access protocols, for single sign-on • Secured TLS 1.3 protocol for server-client communication • Secured HTTPS protocol for integration with external systems through API • Encryption of critical system information and AI models to prevent tampering • VAPT certified to confirm resilience against cyber-attacks
Architecture and platform	• Standalone & federated architecture • Simultaneous Multi-Site Monitoring • Back-up multi-sites data to central location • Failover, fail-safe, and High availability (HA) features • Flexible and scalable Disaster Recovery (DR) system • Direct interface to S3 object storage of Cloud • Unique Master-Master configuration of two systems with data synchronization
Resolution	• Supports D1, 720p, 1080p, 4K, and more

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File formats	• Video Formats : MP4, MJPG, AVF, AVI, frame rate (full/half) and encryption • Image Formats : BMP, GIF, TIF, JPG and PNG
Compression	• Supports H.264, H.265, H.265+
Face registration	• Individually or in Bulk. Supports multiple images per person. Supports auto registration.
Users	• Unlimited.
Face gallery	• Virtually unlimited
Attribute detection	• Age range, Gender (optional feature)
Face identification criteria	• For Detection and Indexing: 25x25 Pixels Minimum • For Recognition: 50x50 Pixels Minimum
Response time	• Less Than 2 Seconds (from 1 million faces) • Less than 10 seconds (from 100 million faces)
Browsers supported	• Firefox, Chrome, Safari, Microsoft Edge, Opera
Display resolution	• Supports multiple display resolutions across large monitors, desktops, etc
Integration	• It provides API for integration with external systems
Dashboard and report	• Various dashboards and reports are available, such as number of unknown faces. Gender-wise distribution, age-wise distribution etc.
Audit log	• User activity logs exported as MIS reports.
Edge-to-cloud elastic architecture	• Supports distributed computation: a) entirely on edge devices, b) face capture at the edge and recognition at the cloud, c) face detection, face feature extraction at the edge and face database matching at the cloud, and entirely at the cloud.