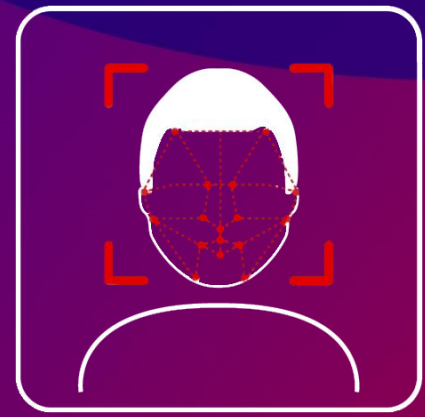
Facial Recognition 2.0

New Focus on Face Recognition
TRASSIR video analytics module for facial recognition



TRASSIR today

Experience in CCTV surveillance

SINCE 2002

15 000 +
loyal customers around the globe

3 R&D centers

50 countries with TRASSIR installations

Advantages of working with us

Advanced technological support

Pre-sale engineers during the testing period at the client's site

Design tools

BIM families, equipment drawings, wiring diagrams and installation

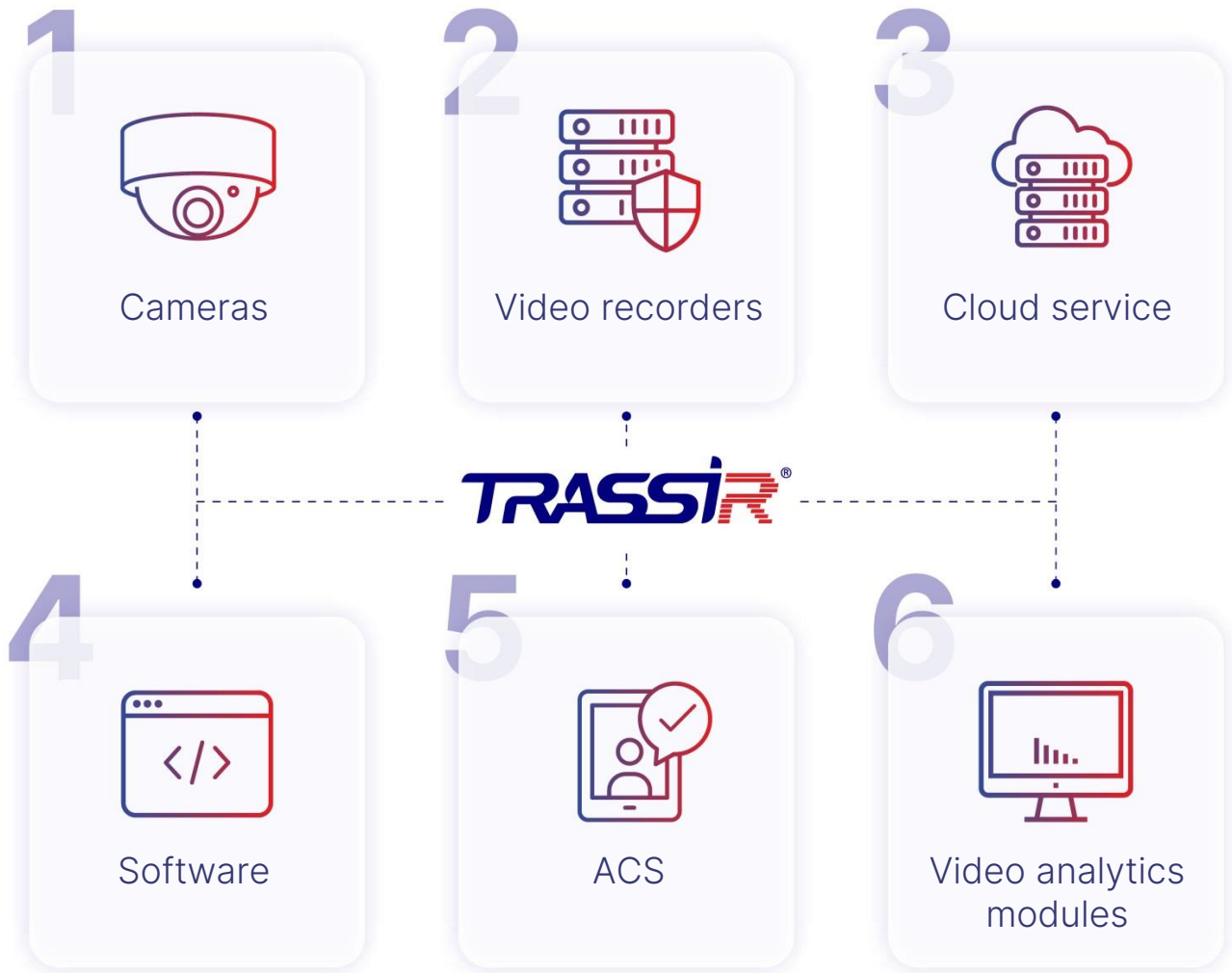
Technical support

Specialist help by phone and messengers Telegram and Viber

Technology laboratory

Customization for individual tasks by clients with TRASSIR experts

TRASSIR for effective security monitoring



New Focus on Face Recognition

TRASSIR Face Recognition 2.0 – a new and improved version of the Face Recognition smart video analytics module for facial recognition and people search based on a pre-configured database.

Highly efficient and reliable, provides accurate recognition in a variety of scenarios.

Face Recognition → **Face Recognition 2.0**

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Face Recognition 2.0 Module Technology

Capable of Differentiating Real Faces from Photographs

Task:

When using facial recognition for dual-authorization ACS, you may encounter a situation where employees use badges and photos of their colleagues to simulate their presence in the workplace. As a result, the employee receives a salary without actually having been at work

Advantages:

Doesn't require any interaction between the detector and the system

Solution:

Such fraud can be eliminated thanks to the "facial vividness" detection function. This technology allows you to distinguish a live person's face from a photo and deny access if there is a photo in the frame

Creating a Database of Unique Persons

The database of unique persons stores reference photos for making comparisons.
All appearances of the person recognized in the video are viewed in the face log.

How the database of unique persons is created

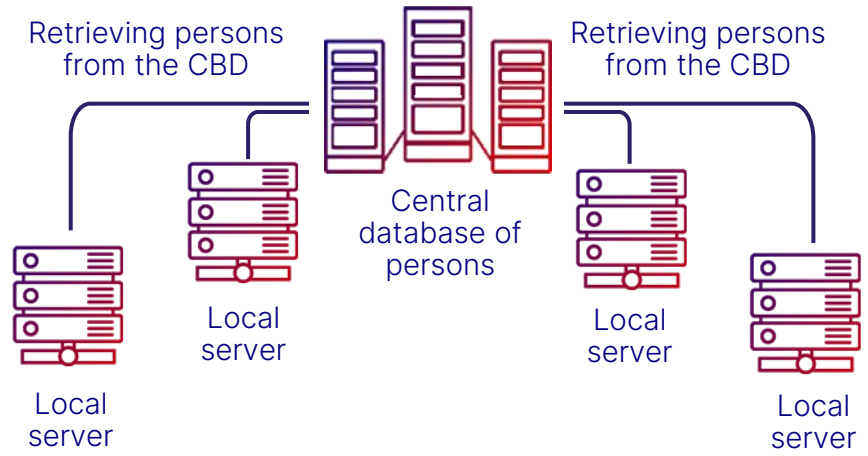
- You can add people's photographs using the operator interface
- You can also create a person and add a photo of their face using the face log
- You can import a data base with photographs

Additional

- You can copy and transfer bases of people from one server to another
- When adding photos to the person database, the following verifications occur:
- The system doesn't allow a person to be added to the database twice, even when using different photos
- The system doesn't allow photos without a face to be added
- These verifications simplify database administration and help keep it up to date

Using a Central Face Database

Face Recognition 2.0 supports a multi-server system: it successfully operates as both part of a single server and in a multi-server system with a single Face Database, thereby saving server resources.



How does it work:

A central database of faces is stored on one of the servers. The other servers have local copes which are regularly synchronized with the central server.

Advantages:

Ease of administration: you can make changes to the face database on the central server only.

Face recognition works even when the connection between servers is unstable

Counting Unique Visitors

The visitor analytics function is integrated with the TRASSIR Face Recognition 2.0 module with the TRASSIR Face Analytics module – a face recognition and analytics module.

Counting unique visitors

TRASSIR Face Recognition 2.0 recognizes unique visitors and allows you to set up face counters on connected cameras. Accurately determines the number of people in the frame.

Visitor analytics

TRASSIR Face Analytics analyses data and collects statistics on sex, age, and number of unique and returning visitors. Improves the quality of service and offers the goods and services you actually need.

Advantages:

The visitor counting function is to monitor queues and waiting areas, as well as public gatherings; it also prevents suspicious unauthorized gatherings.

Advantages:

Collection and analysis of accurate quantitative data about visitors at facilities and events improves security and event organization.

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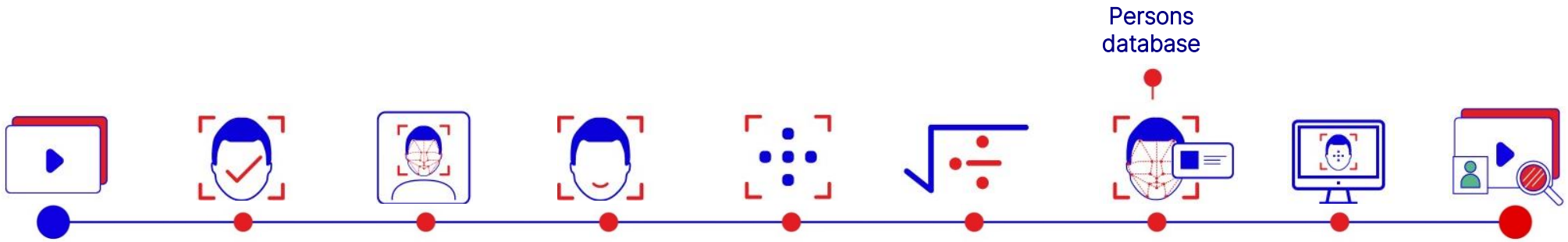
Face Recognition 2.0 Module Features

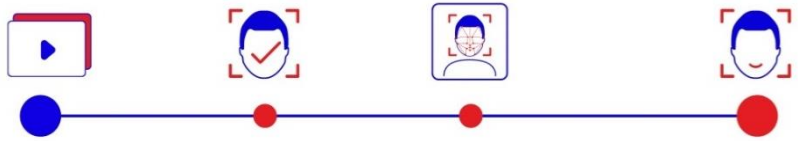
How Does Face Recognition Work?



Updated Feature: Unique Architecture

We developed a unique architecture that allows multiple stages of face recognition to be performed simultaneously.

Before



Video stream

Detection

Detecting a face in a frame

Determination of key points

Finding anthropometric points on the face

Facial Expression

Converting facial images to a single format

Series of multiple neural networks and algorithms

After

Video stream

Detection
Determination of key points
Alignment
Determining rotation angles

One neural network performs multiple operations simultaneously, which helps save computing resources

Updated Feature: False Detection Filtering Technology

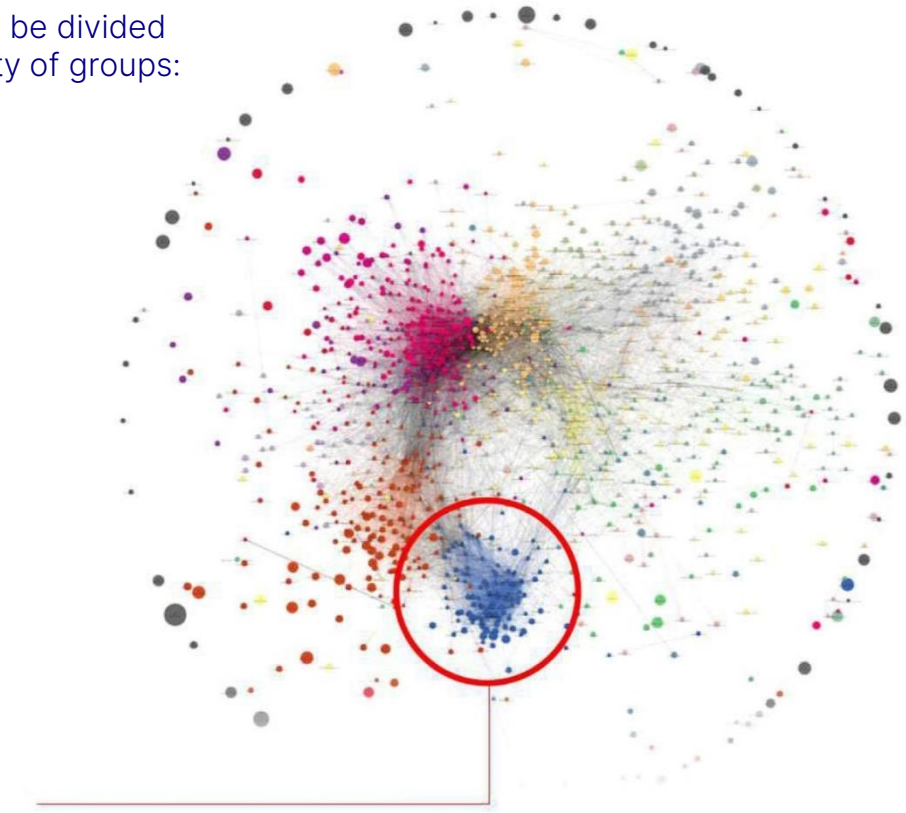
We implemented a new false detection filtering technology based on clustering.

- Faces are distributed into clusters by similarity
  The neural network conditionally distributes faces into 400,000 clusters grouped by similarity and determines which cluster it belongs to.

- A ‘garbage cluster’ is formed
  The ‘garbage’ cluster includes low-quality facial images and images of objects that are not faces.

- False detection is identified and discarded
  After highlighting facial features, the face is checked if it falls in the ‘garbage cluster’. If it falls into this cluster, it is most likely a false detection and is discarded.

All faces can be divided into a plurality of groups:



If a face falls into this group, it is most likely a false detection!

Updated Features: High-precision Face Tracking mechanism

We introduced a new face tracking mechanism.

Before: optical tracking

- Low efficiency when faces overlap with each other
- Low efficiency with a bad angle

Now: feature vector-based tracking

- If a face disappeared from the frame and then reappeared, a new tracker matched it with a previously detected track and compared unique facial features.

Comparing Indicators

Face detection quality:

Old version
88%

New version
99.8%

Quality of recognition:

At difficult angles, the new version has 20% better recognition

Number of false face recognitions:

Old version
11%

New version
~0%

Number of false detections:

The number of false face detections (arms, legs, bags etc) drops to 0

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Ready-made business and security solutions with Face Recognition 2.0

Banking Sector

Detecting forged documents

If it is suspected that a client has presented a falsified contract to another person for the purposes of withdrawal, the manager can compare a photo of the genuine owner of the agreement from the CPM database with the potential fraudster. Takes action if fraud is confirmed.

Preventing transactions with someone else's bank card

The system recognizes the face of the person making transactions with a card at an ATM and compares it with the photo of the genuine card owner from the CPM. If there is a discrepancy, the manager contacts the real owner or blocks the card.

Detecting bank card theft

A client forgot their card in the ATM, the next client pulled it out before the ATM could withhold it and made purchases. The incident was investigated: the face of the thief was recognized and blacklisted.

Preventing unauthorised access to data

An access control system with dual authorization based on biometric features will help prevent intruders from entering the bank office and leaking information. Thus, the use of a stolen pass or someone else's pass in collusion with its owner is avoided. The thief's face is recognized and blacklisted.

Retail

Tackling theft

Upon detecting theft, the thief's face is recognized and placed on a single ‘ban list’. If the thief returns, they are either barred from entering or their actions are carefully monitored.

Tackling employee fraud

Facial recognition detects employee attendance, detects ‘phantom workers’ employed so that someone else can receive their salary, and prevents fraud committed by using other another employee's pass to register working hours.

Industry

Maintaining privacy

An access control system with identifier- and face-based authorization, uses a face recognition module to prevent unauthorized access as a result of stolen identifiers or their transfer to third parties.

Monitoring visits to the company

An access control system is deceived by presenting an identifier and a large photograph of its owner at the checkpoint rather than the actual person's face to simulate the person's arrival at the workplace, concealing absenteeism. Face ‘aliveness’ recognition technology will detect such fraud.

Business Centers And Offices

Monitoring employee performance

The access control system is integrated with the face recognition module to determine the employee's arrival and departure time, actual working hours, time spent in the break room, and movement between rooms, and automatically generates an action report.

Restaurants And Hotels

Brand promotion on the internet, advertising effectiveness assessment

Face Recognition 2.0 recognizes unique and returning visitors, performs demographic analytics, and calculates conversion. The analytics performed improve the effectiveness of targeted advertising, after which Face Recognition 2.0 calculates the influx of new unique visitors.

Monitoring employee performance

Security personnel at large restaurants cannot remember the faces of every employee and therefore cannot recognize the person violating workplace rules. Face Recognition 2.0 recognizes violators and automatically generates reports on hours worked and time spent away from the workplace, which form the basis for sanctions or disciplinary action.

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Recommendations Camera and Recorder Selection

Selecting a Camera

For the detector to function correctly, the distance between pupils in the resulting image must be at least 60px.

The average distance between pupils in an adult is 64mm. Therefore, the pixel density in the capture area should be 60/64 ~ 0.938px/mm = 938px/m.

The required camera resolution depends on the width of the field of view:

- With an object distance of 5 meters and a field width view of 2 meters, the required resolution is 2MP
- With a width of 3 meters – 5MP
- With a width of 4 meters – 8MP

TRASSIR Recorders For Face Recognition 2.0 Module

NeuroStation 8200R/16 INT

Support video analytic modules based on neural networks. The use of neural network technologies has significantly reduced the number of false positives.

IP-video recorder is designed for up to 16 IP cameras.

NeuroStation 8800R/128 INT

PC Server series IP video recorders support video analytic modules based on neural networks. The use of neural network technologies has significantly reduced the number of false positives.

IP-video recorder is designed for up to 128 IP cameras.

UltraStation 16/10-i

Supports RAID 5 disk array technology and hot swappable disks (HotSwap). A SAS interface is provided for connecting two disk shelves.

IP-video recorder is designed for 128 IP cameras

TRASSIR®

welcome@trassir.com
www.trassir.com