

3DiVi FRS

FACE RECOGNITION SYSTEM

3DiVi FACE RECOGNITION SYSTEM (3DiVi FRS) is an innovative software and hardware suite that brings together and provide the full range of facilities for collecting, storing, matching and identifying facial images. 3DiVi FRS is to the maximum adapted to solving the task of mobile automatic real-time identification of individuals from facial images (express ID checks).

3DiVi FRS Features

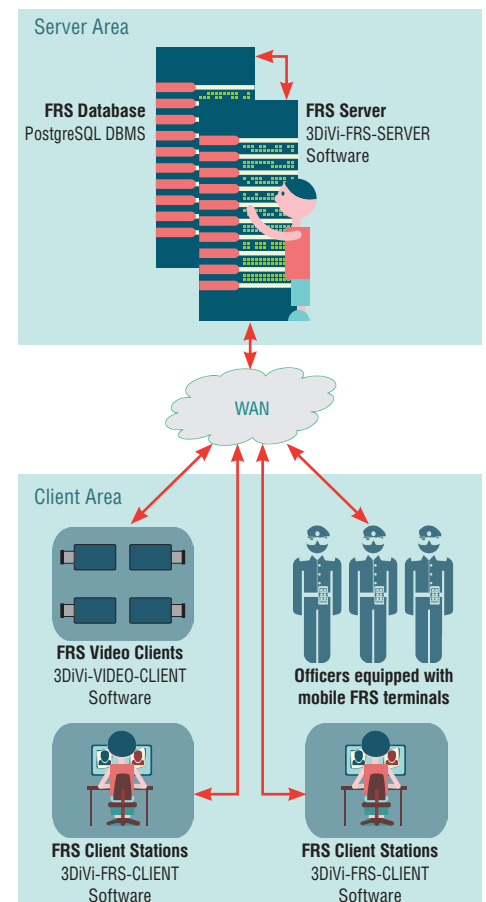
- Operates a database comprising two searchable galleries: of known (enrolled) individuals and of those unknown (unsolved criminal, 'face in the crowd' and other cases)
- High-speed automatic search of the database to compare each newly entered facial image to on-file images and generation of a candidate list for visual analysis by an expert
- Allows creation of watchlists for various applications («black» and «white» lists)
- Automatic transfer of watchlists onto smartphones
- Mobile identity checks by facial biometrics in real-time mode against watchlists located on smartphones

Think of 3DiVi FRS anywhere that identification, verification or authentication of personal identity by facial biometrics is needed:

- law enforcement and field investigative operations
- access control and monitoring of movements within a protected perimeter
- room, street and other public space monitoring
- enrollment and identification of regular customers in retail store networks, etc.

3DiVi FRS supports flexible configuration of its computational and software facilities to meet customers' needs and agency mission requirements.

FRS System Structure



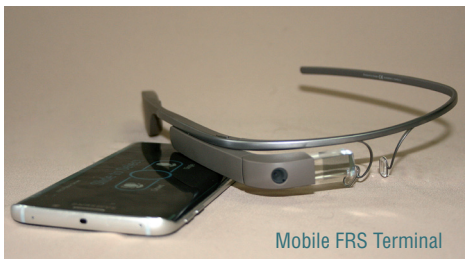
3DiVi-FRS-SERVER software provides:

- Interaction with the database managed by PostgreSQL DBMS, for data entry and storage
- Automatic processing of incoming images and high-speed search of the database for potential mates
- Interaction with client workstations
- Cataloguing of watchlists originated on workstations
- TCP/IP connectivity with mobile FRS terminals for downloading and updating watchlists
- Communication with 3DiVi AFIS server for importing facial images and demographic data acquired at fingerprint enrollment of individuals

3DiVi-FRS-CLIENT workstation software suite provides:

- Communication with the server and the database through web-interface for:
 - adding, deleting and editing database record files
 - retrieving and viewing on-file records, including candidate lists, and establishing identity
 - submitting interrogation requests to search the database
 - originating 'white' and 'black' lists for any purpose.

Mobile FRS Terminals performing real-time 1-to-many identification against local 'white' and 'black' watchlists, are the main innovative system components, which distinguishes 3DiVi's FRS technology from other facial recognition systems now available on the market.



3DiVi's Mobile FRS Terminal comes bundled with:

- Samsung Galaxy S6 smartphone
- Google Glass v3 smartglasses
- 3DiVi-FRS-SMART-EXPRESS-CLIENT software for smartglasses and smartphone
- External power bank > 5000 mAh
- Waist bag for smartphone and power bank (optional)

How It Works

3DiVi's software installed on the smartglasses provides the graphical user interface allowing:

- Automatic transmission of video streams from the smartglasses camera onto the smartphone
- Imaging on the smartglasses display of the recognition results on faces coming in sight of the smartglasses camera

3DiVi's software installed on the smartphone enables:

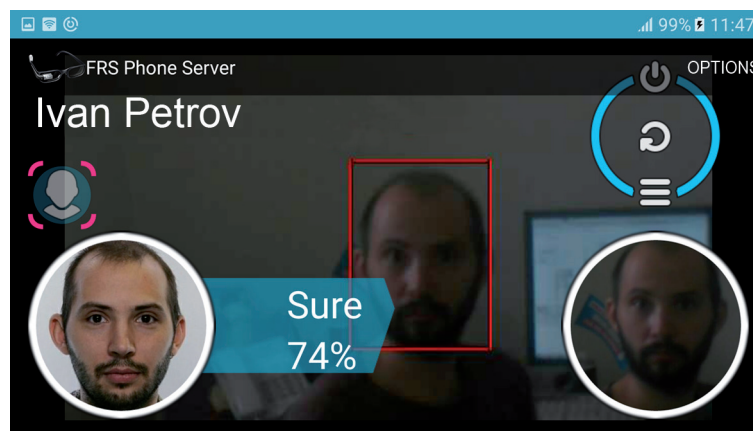
- TCP/IP connectivity with the FRS server for downloading and updating local watchlists
- Receiving and decoding of video stream coming from the smartglasses camera
- Extracting and coding of images of faces coming in sight of the smartglasses camera
- Real-time identification of facial images against local watchlist
- Transfer of positive identification results onto the smartglasses display

All the above-listed operations are performed automatically and do not demand from the officer wearing the smartglasses any command or other actions.

While the smartglasses camera is constantly working, the smartglasses display is activated only upon receiving a positive identification result, the rest of time being passive and not deflecting the officer from performing his duties.

3DiVi Mobile FRS Terminal: Key Features

Local watchlist	up to 500,000 subjects
Comparison rate per second	9,000,000
Identification time (after facial image capturing until the identification result is output)	1-2 seconds
Recommended distance to the subject (using the camera zoom function)	< 8 meters
Autonomy (operating time when using the external power bank)	> 8 hours



Hit result on the smartglasses display. The background image is a video frame with automatically captured and localized (with a red frame) face. The image in the lower left is the matching on-file portrait.

Matching Algorithms

As mentioned above, 3DiVi FRS is designed to operate two types of searchable watchlists 'black' and 'white'. Obviously, checking the individual's identity against 'black' lists is topical for law enforcement bodies during anti-criminal activities. Oppositely, the white list capability can help to solve the tasks of authorization and access control.

3DiVi's FRS search technology features the customizability of probabilistic characteristics of accuracy and reliability of comparisons as applied to a particular watchlist, depending on the priority of either of these two characteristic in each particular case.

3DiVi FRS uses 3DiVi FaceSDK search algorithm that provides the following ratio of accuracy and reliability in automatic comparisons (specific data may vary depending on settings, environment and logic of the system use): **FAR** (False Acceptance Rate) – 1e-06 (0.0001%); **TAR** (True Acceptance Rate) – 0.7451 (74.51%).

Since the start of 2017, our algorithm has been participating in the NIST* Face Recognition Vendor Test (FRVT), and, as it is reported (see published results at <https://www.nist.gov/programs-projects/face-recognition-vendor-test-frvt-ongoing>), is demonstrating its high efficiency.

* Results shown from NIST do not constitute an endorsement of any particular system, product, service, or company by NIST.