

Technical Specification



FaceVACS-DBScan assists people in finding duplicate images in large databases by exhaustive facial image analysis. Images from different sources can be quickly compared to those stored in multi-million image databases, resulting in user adjustable match lists of the most similar faces. Beyond running as a ready-made application, FaceVACS-DBScan has open programming and database interfaces that allow for integration into any customer applications and infrastructure.

FACEVACS[®] TECHNOLOGY

Face Recognition engine is robust against

- Typical gesture changes
- Pose (+/- 15° deviation from frontal image)
- Minor partial face occlusion
- Beard and Hairstyle changes
- Glasses (except dark sunglasses)
- Lighting changes that do not cause strong shadows

Based on the latest and best FaceVACS[®] technology

- Incorporates A14T8 and B4T8 algorithm

Minimal image requirements for facial recognition

- Sharp image
- One face is completely visible on the image
- Inter-pupil spacing larger than 32 pixels
- At least 64 grayscales per pixel within the face area are required for adequate contrast

Optimal image requirements for facial recognition

- ISO 19794-5 compliant Token Frontal or Full Frontal Images

Biometric characteristics

- Adjustable match list similarity
- Image quality assessment

Disclaimer

Like any biometrics, face recognition intrinsically cannot provide 100% recognition accuracy. The remaining uncertainty has to be considered by the customer and can be operationally covered to a certain degree.

FUNCTIONALITY

Biometric identity search

- Probes can be any digital facial image
- Customizable match list size (by number of most similar images or by a similarity threshold)
- Match list sorted by similarity
- Interactive match list navigation for accessing person data

Binning

- Pre-binning by using set of bins
- Gallery is split into bins
- Flexible split criteria at configuration time
- Pre-binning by gallery subset enumeration
- Post-binning after match list retrieval

Interactive enrollment

- From any digital facial image
- Supports visual inspection and manual annotation
- Allows re-enrollment of persons

Bulk processing

- Access to external face photograph databases; can adapt to various naming schemes
- Efficient batch enrollment
- Failure correction and image quality assessment for enrollment
- Import of person related data
- Configurable batch identification
- Constant progress feedback
- Robust, re-start possible

Data Management

- Freely configurable person data
- Operators authorization tag and timestamp is issued for each transaction
- Query wizard for efficient data inspection and administration

Administration

- GUI supported configuration
- GUI supported cluster monitoring
- Configurable SNMP traps and email notification

DATA MANAGEMENT

Storage of case data

- Each case is registered
- Cases are linked if they are of the same identity, i.e. one human being

Storage of face images

- One or more facial images can be assigned to a case
- For each facial image, the eye positions, creation time, data source/ origin and photo quality are stored
- Photo storage optionally compressed or uncompressed

Storage of additional case related data

- The system can store any case related data, like name, year of birth, gender, region of birth, etc

Journal storage

- Records all activities of the system
- Highly configurable (mandatory: time stamp, operator and action)
- Optionally using the same operational database or installed as a separate one
- Enabled for audit tracking
- Accessible via web interface

SECURITY AND ACCESS

Access profiles

- Server-side controlled
- Configurable

PKI infrastructure

- Applied for authentication

CLIENT SERVER APPLICATION

Topology

- Powerful 3-tier application of database server, computation cluster and clients
- Computation cluster consists of one or more cluster controllers and multiple computation nodes
- Communication protocol is TCP/IP
- Central cluster configuration

Clients

- Client applications requesting services from the server are either
- Cognitec graphical user interfaces or
 - Customer developed applications that facilitate the Cognitec programming interfaces

SCALABILITY

- Single machine installation is sufficient up to 2,000,000 enrollees
 - Highly scalable architecture: Doubling the number of computation nodes at 50% of the processing time
- Example:
- Cluster based on five XEON @ 3GHz Standard PC with 800 MHz FSB and 2GB main memory
 - 1 cluster controller
 - 5 computation nodes
- processes a single query against a gallery with 10 million entries within 5 seconds

HIGH AVAILABILITY

- Supports configurations w/o single point of failure (hardware redundancy)
- Multiple cluster controllers (active, standby)
- Multiple Hot Spare nodes
- Automatic reaction to system malfunction (e.g. hardware failure)
- Dynamic cluster reconfiguration at runtime (e.g. adding / removing nodes and cluster controllers)

CLEANSING

- Automatic gallery cleansing
- Vertical cleansing: Find cases with facial traits of different identities but assigned to one identity
- Horizontal cleansing: Find cases assigned to different identity and with facial traits of one identity

EVALUATION KIT

- To measure the real biometric performance of the installed base and given data
- Supports computation of score distribution, ROC, CMC curves
- Allows export of results for extended analysis.

TECHNICAL FACTS

Image format support

- JPG (configurable quality)
- PNG (configurable compression)

Operating system

- Windows XP SP2
- Windows Server 2003 SP1
- Windows Server 2008
- SLES 9, SLES 10
- 32 bit / 64 bit versions

Database

- Microsoft Jet Engine as default (Windows only)
- Runs with Oracle 10g, Oracle 11g, MS SQL Server 2005, IBM DB2 9.1
- Other database on request

Minimum hardware requirements

- XEON @ 2.33 GHz, 2 GB main memory
- 2.5 GB free disk space
- Covers a gallery of 100k enrollees

DOCUMENTATION

- Manual is provided as PDF and HTML

LANGUAGE SUPPORT

- English
- Other languages on request

INTEGRATOR'S KIT

Documented customer integration APIs and database schemes supporting a smooth integration, allowing for customized processing and accessing the data storage structure

Functionality available by API

- Enrollment
- Binning: bin set attribute setting
- Identification (1:all, 1:few)
- Verification (1:1)
- Match list retrieval
- Fully thread safe

API programming languages

- C++ interface; fully network distributable; with access control
- Web Services API; programming language neutral; w/o access control

Data organization

- Published, extensible and adoptable database scheme
- Flexible tools for import of data from existing image repositories

Integration methods

- Documented integration methods and best practices
- Proven in various integration projects

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