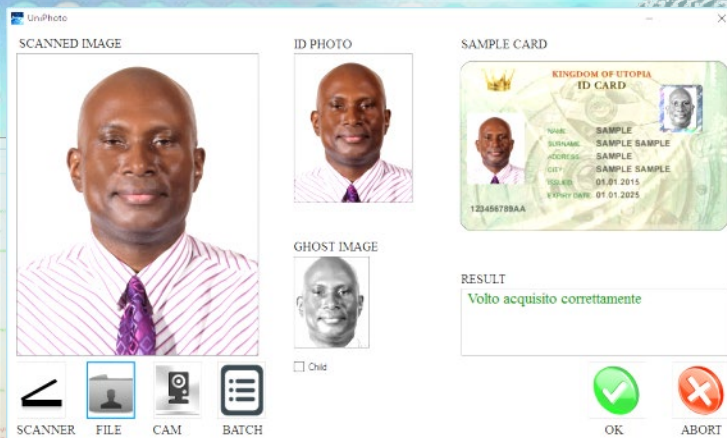


ICAO 9303 ISO/IEC 19794-5



ONE CLICK!



UniPhoto – “the App” PhotoNORM – “the SDK”



www.digit-ale.com – sales@digit-ale.com

THE TEAM – WHO WE ARE



Digit-Ale.com was founded by Alessandro Mehlem in 2017. Alessandro is an expert in biometrics, former member of the Italian branch of ISO/UNI (Uninfo) for biometrics and smart card international standards. He was also member of several technical committees such as Ministry of Interior Tech Committee for the National Electronic ID Card and for the Ministry of Innovation Committee for the use of Biometrics in the Public Administration. He's been also involved in several National Identity and Military ID projects in Italy and abroad.

UniPhoto application design puts together regulations and usability. The application was installed in 8,000 workstations of UniCredit Bank since 2014.



NoiVoi Software was founded in 2015 by Giorgio Alboni, former founder and CTO of Biometrika Srl since year 2005, one of the most widely known Italian companies for biometric HW and SW manufacturing. As Biometrika's CTO, designed a wide range of fingerprint scanners in use by Italian Carabinieri Army, Ministry of Interior and abroad. NoiVoi developed the custom normalization algorithms with proprietary techniques, derived from a long experience in biometric and imaging software design.



HappyTec was founded in 2016 by Walter Del Medico, which is a software engineer, Microsoft fully certified since more than a decade. Walter designed the User Interface and both the hardware and the network connectivity that can be virtually extended to any existing solution. He managed several projects for institutional customers such as INPDAP, TELECOM, INPS, currently acting as an Analyst/Programmer on legacy technologies applied to the most current mobile apps and web applications. CIO since 2006.

THE TEAM – WHO WE ARE



KeeSquare was founded in 2007 by Politecnico University of Milan, Celin Technology Innovation and Ghirlanda Smart Card Solutions. KeeSquare provided its «Morpheus ICAO SDK» solution to the National ID Card project in Spain (a Siemens solution), Dedem (Photo-Me group, a world wide known photo-boot producer), several other ID card quality check in South America and Africa. Morpheus FF was also implemented by Gemalto and Sagem. KeeSquare provided the original ICAO SDK used in UniPhoto.

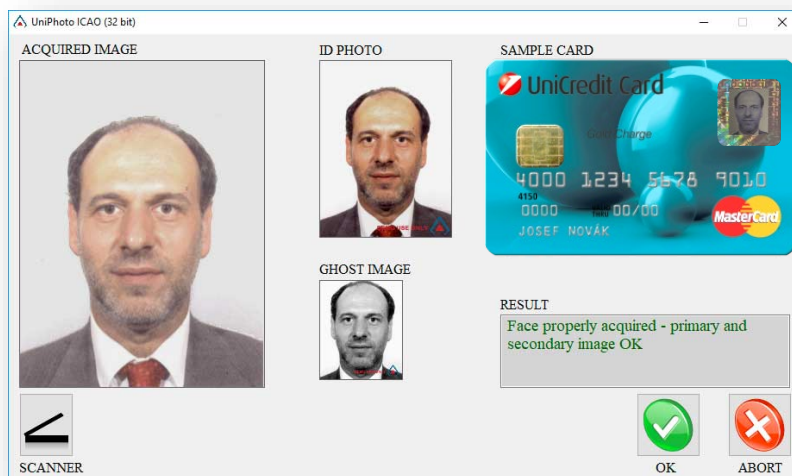


Correlance is, since 2013, the company that took all the range of products originally designed by KeeSquare and kept them alive and constantly updated with several more operating systems available. Moreover, Correlance is the «tender-winner» (April 2016) who provides their solid solution «CC ICAO Engine» to the Italian Ministry of Interior, for the national ID Card ICAO conformity check, supervised by IPZS, the National Printing Office and Mint.

Morpheus ICAO Engine is currently the core of UniPhoto compatibility check, while Morpheus Face Finder is the initial starting point for locating faces and cropping pictures. Other goals achieved are: the voter's ID card in Sierra Leone, Regional ID Card in Argentina, and many more projects currently covered by NDAs.

CC Engine FF (Morpheus Face Finder) source code has been sold to Sagem Morpho and used in several national ID projects such as Holland, Egypt, etc.

UniPhoto: History



To simplify the acquisition of photography by unskilled/untrained operators, it has been developed a software application that allows to perform complex operations and data processing of the images with 'one-click' only.

Since 2014, the application is running on 8,000 workstations in 4,000 offices of UniCredit Bank in Italy.

UniPhoto: History

This screenshot shows a web-based enrolment form titled 'Registration Form'. It contains various fields for personal and address information. The 'Representative Assessee Category' is set to 'Army'. The 'First Name' is 'JOANNA' and the 'Middle Name' is 'DOE'. The 'Flat/Door/Block No.' is '12'. The 'Name of Premises/Building/Village' is 'UTOPIA VILLAGE'. The 'Road/Street/Lane/Post Office' is 'PENNY LANE'. The 'Area/Locality/Taluka/Sub-Division' is 'UTOPIA TOWN'. The 'State/Union Territory' is 'UTO'. The 'Pin (indicating PIN is mandatory)' is '123456'. The '15. Documents enclosed' section includes 'IDENTITY CARD' and 'BIRTH CERTIFICATE'. The '16. I/We' section has 'ACCEPT' and 'ACCOUNT OWNER'. The 'Place' is 'UTOPIA CITY'. The '17. Depository Account Details' section shows 'IP ID: 12' and 'Client ID: NDG 12345'. The '18. Payment Details' section shows 'Demand Draft number' and 'dated DD MM YYYY for ₹ 96.00'.

Previously existing enrolment form

This screenshot shows the same web-based enrolment form as the previous one, but with a new 'Picture' field added. The 'Picture' field is highlighted with a blue circle and contains a placeholder image. Below the placeholder image are two buttons: 'Acquire New' and 'Show Existing'. The rest of the form is identical to the previous one.

New enrolment with UniPhoto plug.in added

No training was needed to let all the operators start using the application since its first day of release, providing a huge economic return due to the absence of a nation-wide training.

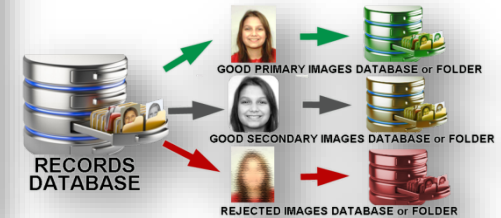
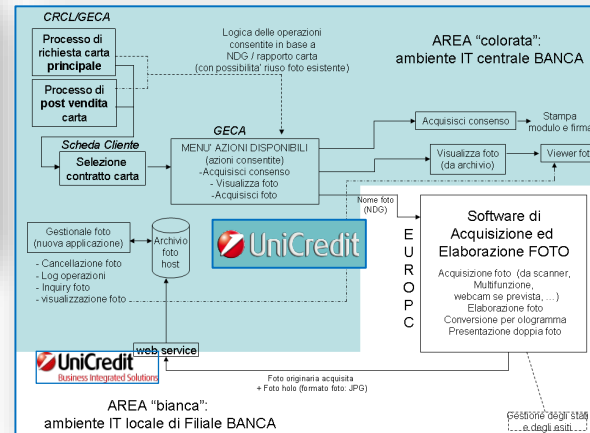
The existing bank enrolment form was simply modified **adding two functions: acquire** a new account holder picture, or **check his portrait**, granting a face matching in each office, nation-wide.

UniPhoto: History



The operator can select the input source (scanner only in such case), then just “Click” to save the scanned document and the drawing of the photograph, which is automatically cleaned, normalized and transformed in both an ID-size color picture and a custom format picture for the Ghost Image further encoding Customer’s holographic credit card (enhanced quality, more detailed and visible face), so that the operator has an immediate feedback of the final result. **No chance of error!**

UniPhoto: UniCredit case – Complex network architecture



Up to date, UniPhoto application is used by UniCredit banking group with the following architecture:

Banking operators are used to input cardholder's data in a dedicated form (credit card application form)

The existing form was not modified at all, but a new button "collect picture" has been added, initially the only input allowed is through a scanner.

Acceptance threshold has been set very high, since it's not a Police application (but not so strict as ICAO acceptance criteria). Nowadays it can be easily set at any Customer's requirement.

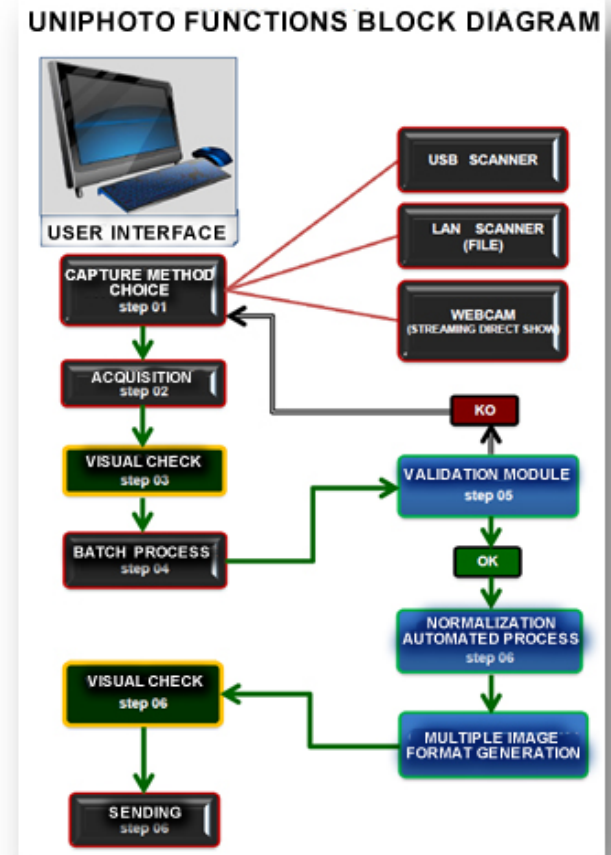
Operators have an immediate visual feedback on the acquired image and the opportunity to tell the client whether it's picture has been accepted or, if not, which was the failure reason.

UniPhoto: introducing PhotoNORM SDKs

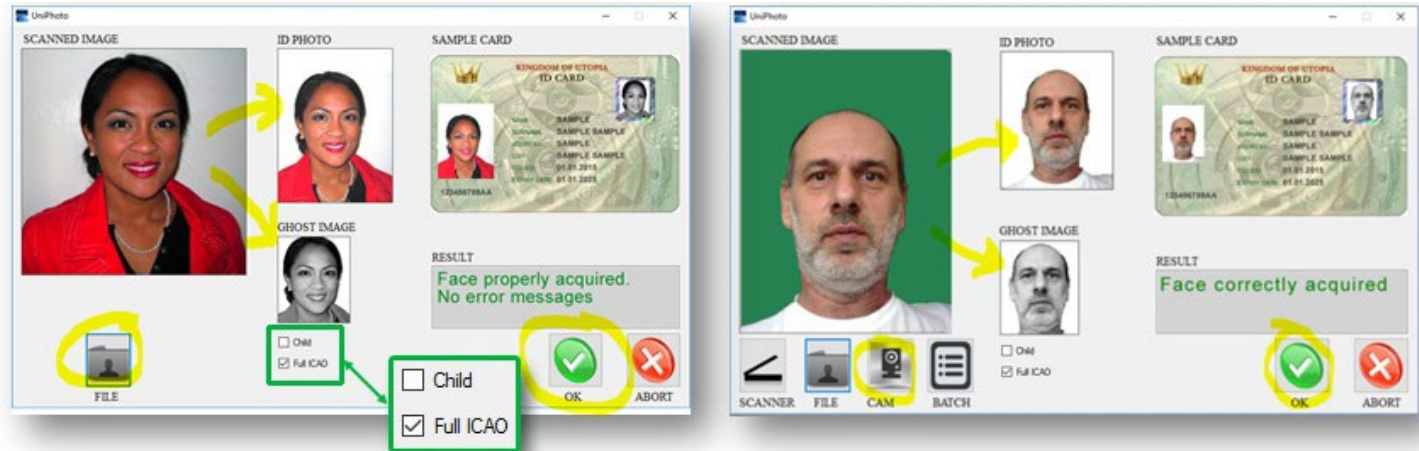
The application is composed by several integrated modules, now available as separate SDKs, each one with a different, specific purpose:

- high quality photographs or picture and document scanning.
- corrections to the poor quality images.
- evaluates any environmental critical situation (brightness, focus, etc..) and takes the necessary corrective actions or alerts.
- rates the final result and establish without any human interaction that results are suitable for being stored.
- performs image validation with light or strict ICAO 9303/ISO/IEC 19794-5 image checks.
- user may choose the source (webcam, scanner, or file), and then capture and display in real time.
- ensures non-repudiation of pictures sent in production for automated personalization.

It drastically influences the cost effectiveness of any project, reducing training expenses.



The real concept of Usability



THE MAIN WINDOW IS THE UNIQUE WINDOW PROVIDED TO OPERATORS:

With a simple choice of the desired input method (file, scanner or camera), operators have not a single chance of mistake: the application does every step automatically.

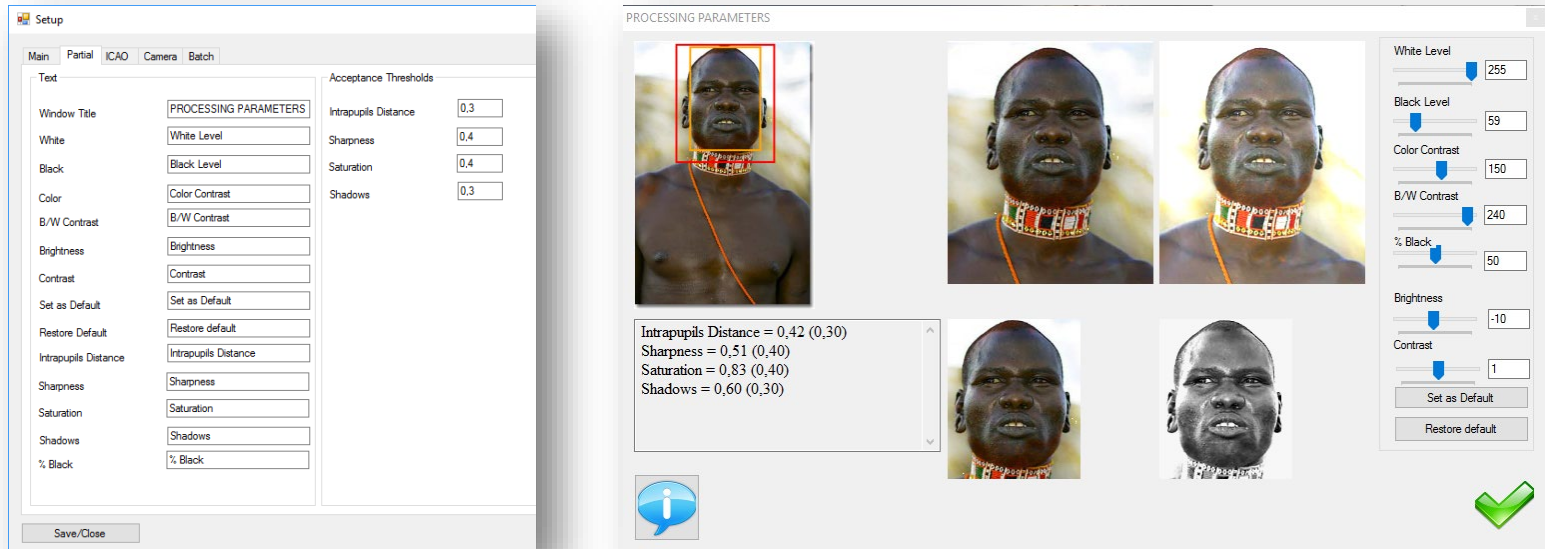
Through a dedicated control panel, system administrators may choose several additional functions, but also which are the choices of input source visible to the user.

A special “Child Mode” choice has been recently added, to simplify children pictures acquisition.

Moreover, the full ICAO parameters check can be manually disabled for exceptional situations (e.g. disabled persons, religious headgears, and so on)

Batch function is just a demonstrative application to show the possibility to interchange data with any existing database.

UniPhoto: Ease of use



The «Intermediate Window» is intended to be managed by trained technicians personnel, it can be independently configured in such cases where Customer's printing devices are directly connected to the PC.

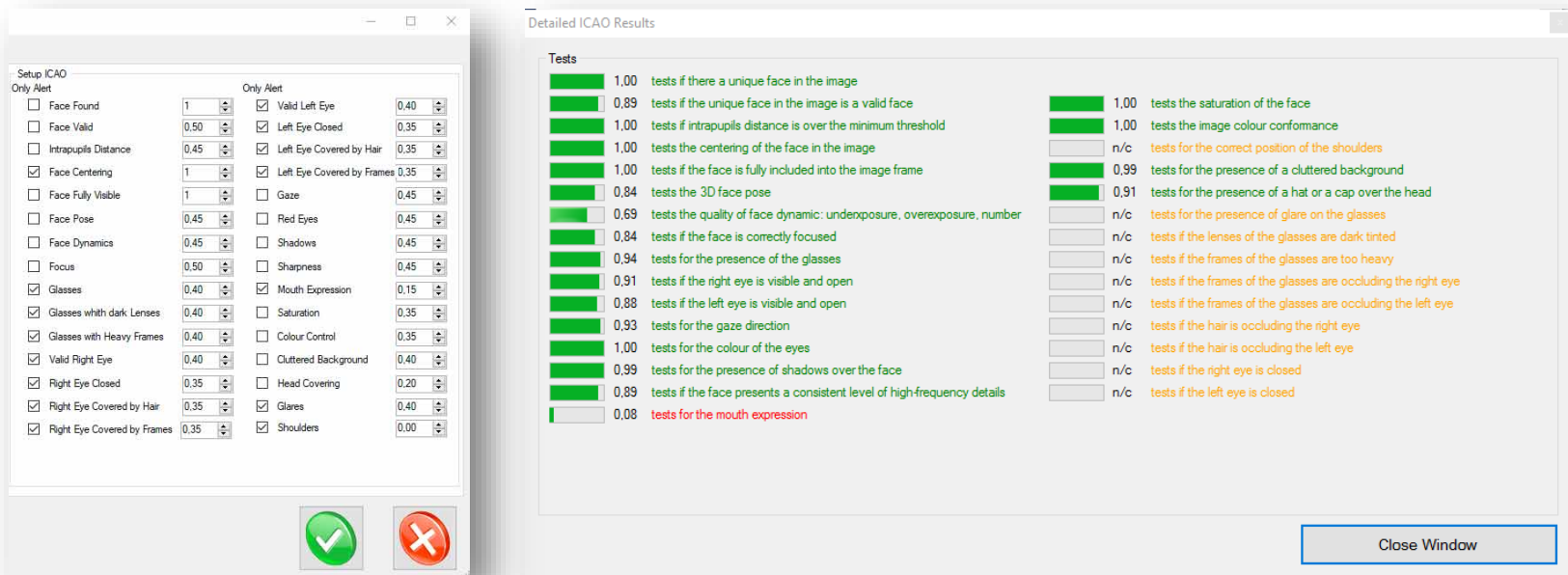
As well as on the other panels, **each field can be translated in any language.**

The **basic acceptance thresholds** can be set through the control panel, mainly for debugging and system calibration purposes, depending on the hardware used for both input and output (printing) devices.

The **custom image processing algorithms perform a special normalization process.** The image is cropped, resized, then depth of colors is equalized, in order to automatically lighten dark images or darken light images.

If the «ICA0 Check» option is activated, a mouse click on the the «Info Icon» will show the ICA0 test results.

UniPhoto: Ease of use

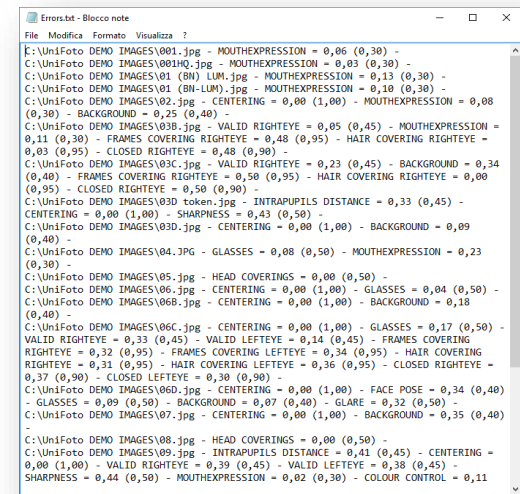
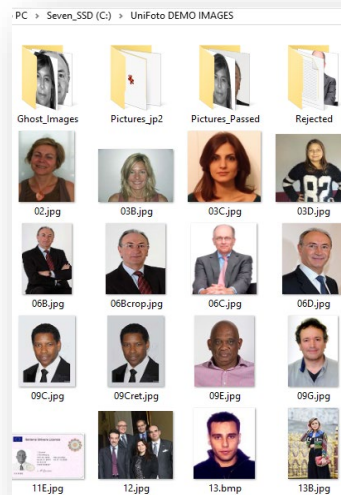
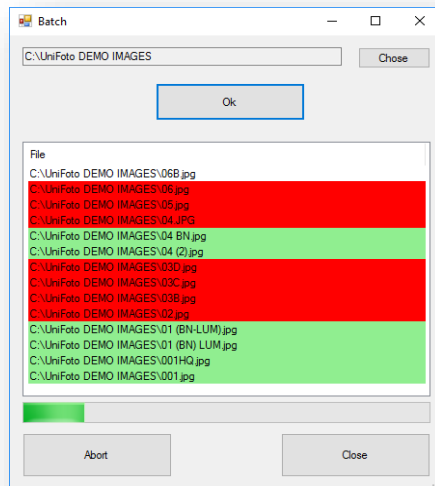


The **core engine** used for finding the face is the **Morpheus FF SDK** (Face Finder), the same solution in use by **Sagem/Morpho** in the Netherlands and Egyptian ID projects.

All the **30 ICAO checks** are **available** and easily configurable through the Control Panel. The «Info Icon» previously shown allows trained technicians to evaluate each single image processed. Now it's possible to double check any image, before and after the normalization process, to ensure reliable results.

Such lighter configurations can be also optimized for non-governmental applications, such as Company badges issuance, University ID Cards, Banking applications and any other document not intended for travel use.

PhotoNORM: Ease of use



UniPhoto's **batch processing** now available as PhotoNORM SDK Suite allows Customers to test the application with their own files.

The default calibration is not intended to be fully ICAO compliant due to the missing possibility to create an universal preset that fulfils any customer's requirement and his hardware configuration.

Any folder on the PC or within a LAN can be chosen, then the batch process will create four folders:

- **Pictures Passed**
- **Ghost Images, facial token or B/W printing**
- **Pictures jp2, jpg, bmp and so on with personalized size/resolution**
- **Rejected**

Batch process takes an average response time between 10 mS up to 500 mS per image, depending on the file size and format.

Improved Face Recognition and ID Check

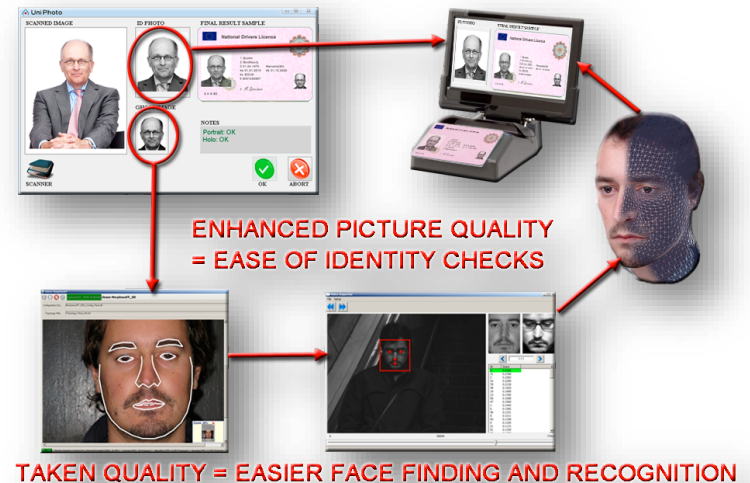
Furthermore, a custom PhotoNORM algorithm improves image quality for facial recognition systems, ID document checkers and so on.

Any image such as a digital ones stored in ID documents or databases may not be suitable for a further facial recognition, in particular if compared with live images captured from a camera or a webcam.

Dark or too white skins, pictures underexposed or overexposed are a known issue for several hardware and software solution used for face recognition.

PhotoNORM SDK helps with the normalization of both stored and live images, improving the matching process up to unexpected results.

Identity document checking systems shows to the results of an image scan which is not always reasonably visible to operators.



UniPhoto: improved printing on ID card, badges, etc.

The screenshot displays the 'CITIZEN ENROLMENT APPLICATION' software interface. On the left, a sidebar contains icons for 'Create a new record', 'Open an existing record', 'Acquire personal data', 'Acquire Photo', 'Acquire Fingerprint', and 'Acquire Signature'. The main window features a table of records with columns: IDnumber, Firstname, Surname, Layout, Function, and Place. The table lists several records, with the first one highlighted. Below the table, there are three panels: 'Photo' showing a man's face, 'Sign' showing a signature 'M. Specimen', and 'Finger T...' showing a fingerprint. To the right of these panels is a preview of a 'National Drivers License' for 'M. Specimen'. A red arrow points from the 'Acquire Photo' icon to the 'Photo' panel, and another red arrow points from the 'Photo' panel to the 'National Drivers License' preview. A third red arrow points from the 'National Drivers License' preview to a printer icon labeled 'DOCUMENT CHECKING'.

FACE RECOGNITION

ID DOCUMENT PRINTING AND PRODUCTION

DOCUMENT CHECKING

UniPhoto improves image quality for both color (thermal or inkjet) or laser engraving printing techniques.

As already told, dark or too white skins, pictures underexposed or overexposed are a known issue for most desktop or centralized printing solutions.

UniPhoto picture normalization can be tuned on any existing system, equalizing both capturing and printing devices, so that, drastically improving the results. It also optimizes the overall process, decreasing enrolment time and production issues.

KeeSquare Morpheus ICAO SDK



Check whether your digital face image is compliant with ICAO and ISO/IEC 19794-5 standards

The **International Standard ISO/IEC 19794-5** is aimed at providing a face image format for recognition applications, which enables the exchange of face image data. Typical applications are:

human examination of facial images

human verification of identity through a comparison of facial images

computer-automated face identification (one-to-many search)

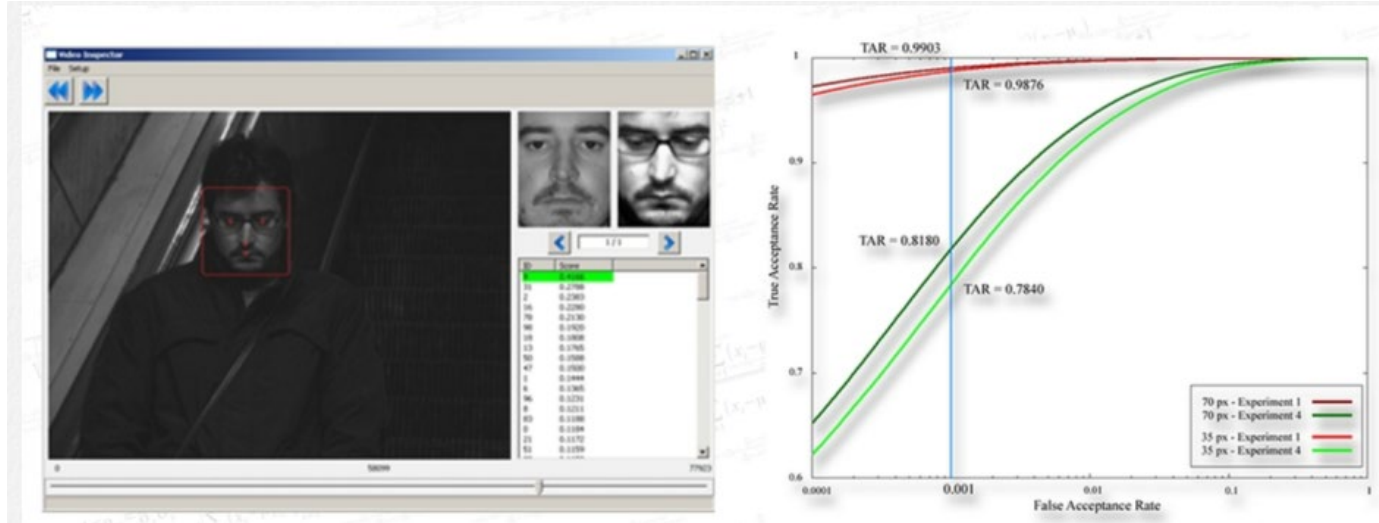
computer-automated face verification (one-to-one match).

In order to enable many applications on a wide variety of devices, and to improve face recognition accuracy, **ISO/IEC 19794-5** specify a data format and provides **scene constraints** (pose, expression etc.), **photographic properties** (lighting, positioning, camera focus etc.), as well as **digital image attributes** (image resolution, image size etc.).

Morpheus ICAO accurately finds face and facial features (eyes, mouth, eyebrows etc.) in images with 8-bit grayscale or 24-bit RGB and automatically check photographic and geometric requirements.

Morpheus ICAO supports (as far as both reading and writing are concerned) the **CBEFF Patron Formats A-C**, with **ISO/IEC 19785-1** and **ANSI INCITS 398-2005** interchange files, and its outputs are fully compliant with the **ISO/IEC 19794-5** standard.

KeeSquare Face Recognition SDK



Develop your Biometric Application with a powerful and fast Face Recognition

Morpheus FR supplies all the modules that are necessary for building and comparing biometric templates:

Face Detection: finds the position and the size of each one of the visible faces in the image

Face Normalization: marks points of morphological interest throughout the face area (eyes, mouth, and eyebrows) in order to properly rotate and scale the image. This operation moves all such points to pre-defined locations.

Feature Extraction: selects relevant features from the normalized image in order to maximize the robustness against environmental disturbance and noise, non-optimal pose, non-neutral facial expressions and variable illumination conditions.

Biometric Template Creation: a trained statistical engine processes the extracted feature vector template. The feature vector is reduced to a smaller one that optimally describes the user's identity.

Biometric Template Matching: the face recognition and the face verification processes are based on measurements of differences between biometric templates. The normalized template distance is the similarity value of the compared identities.

UniCam 2.0

UniPhoto package may include fixed or portable cameras for the optimal ease of use and image quality at very reasonable costs.

UniCam 2.0 has a 2+ Mpx module, with customized lenses, which ensures the minimal facial distortion at 80 cm focusing distance.

Its tripod may work from 30 cm height (desktop) up to 130 cm from ground (chairs, cabins, etc.)

A special dimmerable light diffusion goes from soft (center) to very high (side edges) for an optimal lighting of the subject while minimizing glare, shadow and reflection effects.

Several tests has been performed to ensure best results.

Anyway, depending on Customer's needs, several personalized configuration are possible, such as:

- Lighting sources (LED, 5,200°K or 4-6,000°K extended range)
- Camera resolution up to 4 Mpx
- Tripods or variable height solid aluminium basements
- Accessories such as background tenths or cabins



Optional Services

UniPhoto App and PhotoNORM suite can be easily configured for any kind of governative ID projects or non governative ones.

It can reside on a web service, being accessed from home, office or a mobile device, in order to be platform independent.

Hospitals, Universities, Large Companies, etc. can finally have the highest level of pictures quality combined with a previously unseen ease of use. It's just a click... and go!

Moreover, any custom hardware such as touch screen all-in-one devices (such as point of sale PC), which integrates all the required components, can be offered at competitive price, including a compact ID document and photographic scanning device.

Thin, light and fast, USB powered, is the top choice for anyone who doesn't want to fill desktops with lots of equipment, or simply needs the optimal portability. UniScan offers an A5 flatbed area LED lightened.

