



BIOMETRIC CONTACTLESS FINGERPRINT TECHNOLOGIES



Biometric Contactless Fingerprint Technologies

Today people want to move and travel freely, but also safely. Fast and secure access control, seamless crossing of borders, queue-less passenger checks at e.g. airports and quick identification of individuals are the key for a better security and convenience. By using machine learning methods and exceptional fast software algorithms we are developing biometric high-tech sensor systems for the identification of persons and a fast and secure access control.

Based on our prototypes we are offering high level research and development services to raise the technology readiness level. In close cooperation and according to your specific needs we prepare pmodel.

Based on our international recognized experience in the field of smart border control and as coordinator of the main EU funded projects in this context (see reference projects list, last page), we develop novel solutions and prototypes for the identification of individuals on the move. We combine ingenious algorithms and embedded hard- and software solutions for realizing new access control solutions, ranging from low to high security applications and requirements.

We implement contactless biometric solutions in mobile devices to ease the work of Law Enforcement Agencies (LEAs) or other safeguards. The new approach for capturing fingerprints with a mobile device in a contactless way enhances the security, speeds up the border control process and makes biometric verification less cumbersome and far more hygienic to individuals and officials.

OUR SOLUTIONS

- Software for biometric contactless ten-print fingerprint acquisition on smartphones
- Dedicated ten-print contactless fingerprint sensors
- Prototype of a convenient access control solution
- Mobile device for biometric authentication (eMRTD, Face, Finger)
- Feasibility studies and evaluations

Software for biometric ten print contactless ten-print fingerprint acquisition on smartphones

For applications based on commercial of the shelf (COTS) products, AIT developed a module for capturing fingerprints with a normal smartphone without additional requirements. The solution reaches a GAR (General acceptance rate) of 97%, which is the ICAO recommendation for identification purposes.

Further information: <https://www.ait.ac.at/en/research-fields/surveillance-protection/digital-identity-management/mobile-authentication-tools-on-smartphones/>

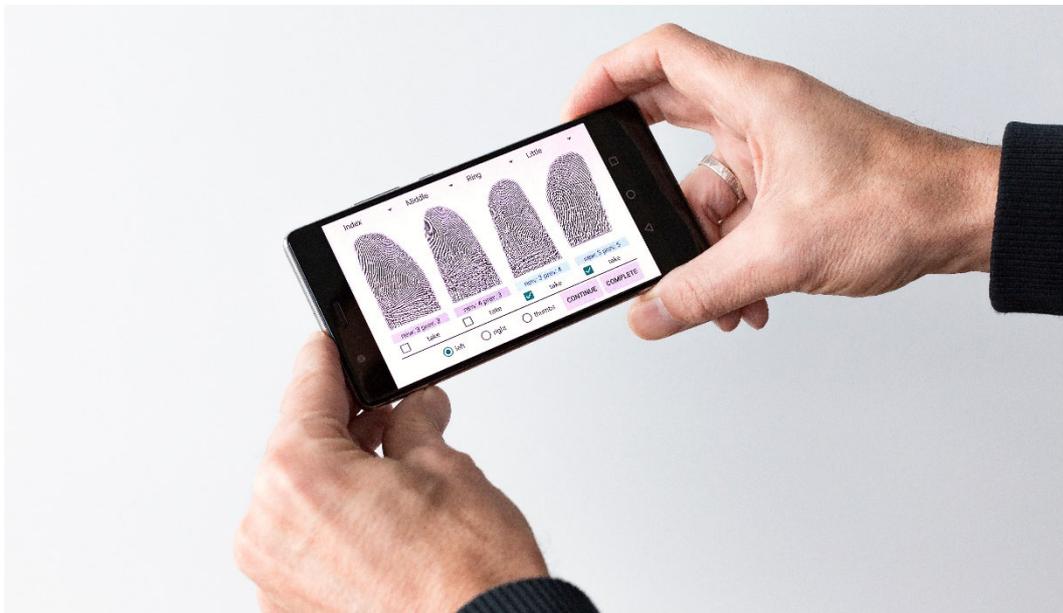


Figure: four fingerprint capturing on a smartphone

The built-in camera works as a scanner module for reading the machine-readable zone (MRZ type 1,2 and 3) of a passport and transforms the text via optical character recognition into a digital format, enabling the phone to access the passport chip for verification.

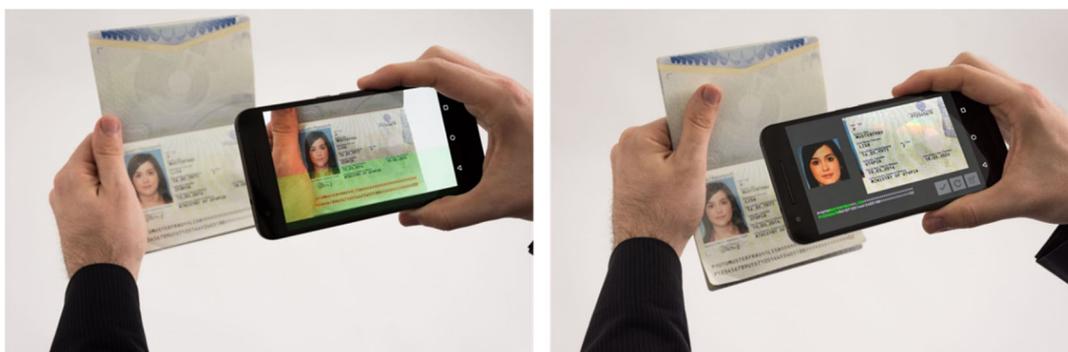


Figure: MRZ reading of a passport

Dedicated ten- print contactless fingerprint sensors

Touchless fingerprint recognition systems have several advantages since they do not require contact of the fingers with any acquisition surface and thus provide an increased level of hygiene, usability, and user acceptability of fingerprint-based biometric technologies. The real-time capture process consists of the following steps: Acquisition of high resolution finger images and computation of contact-equivalent fingerprints. Finally, the determined fingerprints can be used for authentication.

Power plant operators, governmental entities and businesses benefit from the myriad of cyber technology developments – whether it addresses access-control to critical infrastructures, governmental applications for driver’s licenses and health services, or business identification tools like ATM and e-commerce solutions. All these terrains require easy to handle and highly secure identification and verification solutions. Today, fingerprint scanning has become a reliable form of biometric authentication for the mentioned fields. Our high-tech sensing unit offers the realization of new biometric identification and verification solutions and applications.

See our video demonstration: <https://www.youtube.com/watch?v=aA-NrUs8IRc&feature=youtu.be>



Figure: contactless fingerprint sensor system

Prototype of a convenient access control solution

By miniaturising and embedding the technology into an automated (turn style) access control door manufactured by WANZL, we can show a highly secure and convenient way for biometric identification on the move. The solution can be combined with chip cards for a two-factor authentication solution.

See our video demonstration: <https://www.youtube.com/watch?v=aA-NrUs8IRc&feature=youtu.be>



Figure: contactless fingerprints scanner integrated in eGate

Mobile device for biometric authentication (eMRTD, Face, Finger)

AIT developed a dedicated, secure and mobile device for Law Enforcement Agencies (LEA's) for biometric identification and travel document inspection on the move. A typical application is border control. The platform combines leading edge technologies, like contactless fingerprint scanning, facial verification, optical passport scanning and passport chip reading. In contrast to existing mobile solutions the hardware itself is a trusted platform module with encrypted operating systems and applications. 3G/4G, Wifi and Bluetooth connectivity ensure interoperability with other IT systems. The developed system is based on a MPSoC design (Multi Processor System On Chip) paving the way for future applications like IRIS scanning.

See our video demonstration: <https://www.ait.ac.at/mobilepass>

Further information: https://www.ait.ac.at/fileadmin//user_upload/MobilePass_Flyer_Extended.pdf



Figure: contactless fingerprints scanner prototype tested by border guards

Feasibility studies and evaluations

AIT offers system design in hard- and software for capturing contactless biometrics. In this example a feasibility study was done for vascular pattern recognition, commonly also referred to as vein pattern authentication. Near-infrared light in combination with adapted filters and sensors is used to capture the unique pattern of a palm vein.

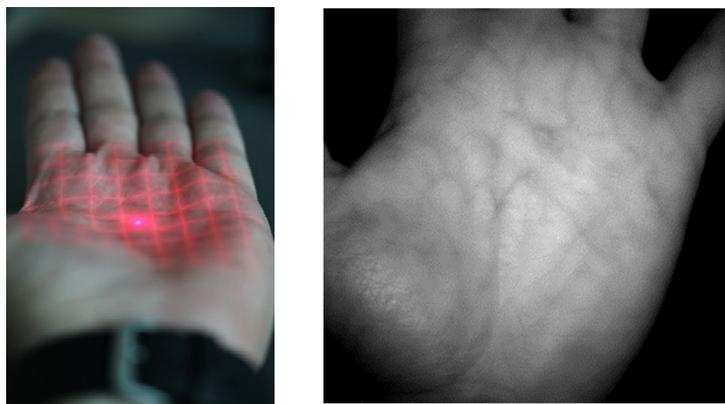


Figure: prototype developments for a vein scanner

We offer customers the service of having systems compared, tested or analyzed in studies either individually or combined. Uniform procedures and tools for structured, methodical testing of biometric systems ensure an objective evaluation.

- Testing of interoperability, performance, robustness against circumvention, and ergonomics
- Analysis of biometric recognition capabilities
- Consulting in the development of biometric systems
- Implementation of test series

Reference Projects (Excerpt)

MOBILEPASS (AIT as Coordinator) - a secure, modular and distributed mobile border control solution for European land border crossing

Funding Scheme: EU FP7, Capability Project

Topic: development of an embedded and secure mobile system doing a passport chip read, active and passive authentication via certificates, BAC and EAC chip access and biometric verification of facial and fingerprint information stored on the chip.

MODENTITY (AIT as Coordinator) - Smartphone-basierte hochmobile Dokumenten- und Identitätsverifikation für die Personenkontrolle der Zukunft

Funding Scheme: FFG KIRAS

Topic: national (Austrian) project, that targets to improve mobile document authentication and identity verification to define the person checking procedure of the future.

FASTPASS (AIT as Coordinator) - a harmonized, modular reference system for all European automated border crossing points

Funding Scheme: EU FP7, Integrated Project

Topic: establish and demonstrate a harmonised, modular approach for Automated Border Control (ABC) gates.

BODEGA (AIT as member) - Proactive Enhancement of Human Performance n Border Control

Funding Scheme: H2020

Topic: is a research project on developing smart and ethical future border control concepts, future border crossing processes conducted by border guards (new procedures, new management and shift organisation) solutions to deal with human characteristics on order to improve the efficiency and effectiveness of border control.

E-PARTIZIPATION (AIT as Coordinator)

Funding Scheme: FFG KIRAS

Topic: E-PARTIZIPATION is a national (Austrian) project to establish an identity ecosystem using electronic identities for participation in governmental activities. A system is designed that provides multiple identification methods for users on the platform.

IoT4CPS (AIT as Coordinator) - Internet of things for cyber physical systems

Funding Scheme: FFG, partly ICT of the Future

Topic: national (Austrian) Lead-project, focusing on research and development on methods, guidelines, and tools for emerging complex cyber-physical systems for a secure and trustworthy implementation.

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