

Erfahrungen mit dem automatisierten und harmonisierten Grenzübertrittkontrollsystem FastPass



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 - Warteschlangenoptimierung
- Szenarien
 - Luftgrenze (Wien-Schwechat)
 - Seegrenze (Piräus)
 - Landgrenze (Moravita)
- Ausblick

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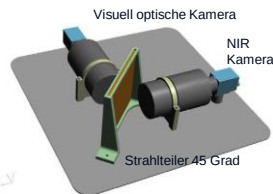
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Übersicht

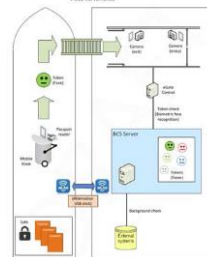
- FastPass-Projekt, Konsortium, Ziele, Ergebnisse und Zeitachse
- Sensoren der nächsten Generation, Algorithmen und Konzepte
- Innovative Szenarien und geplante Demonstrationen
- Résumé und Ausblick



Kamera-Spiegel-System für Kiosks (von Modi)



Multispektraler Iris-Sensor (University of Reading)



Szenario „Seegrenze“

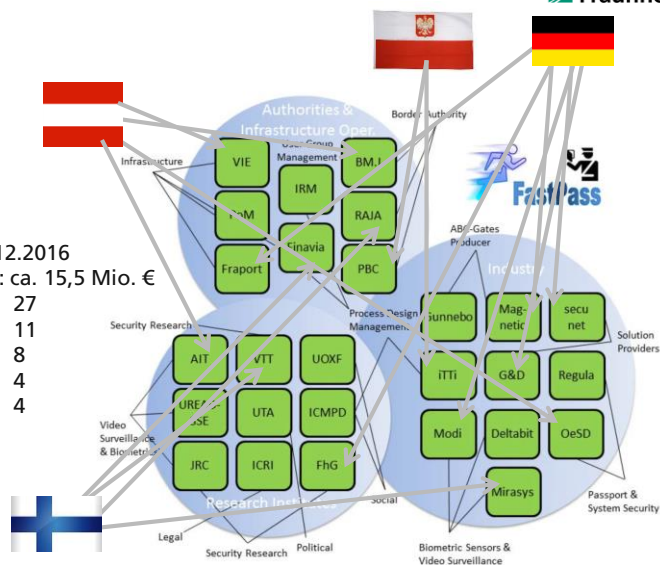
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FastPass

Konsortium
Überblick

- IP 48 Monate
- 1. 1.2013 – 31.12.2016
- Gesamtbudget: ca. 15,5 Mio. €
- Partner: 27
- Industrie: 11
- R&D: 8
- Anwender: 4
- Behörden: 4



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Motivation

Herausforderungen:

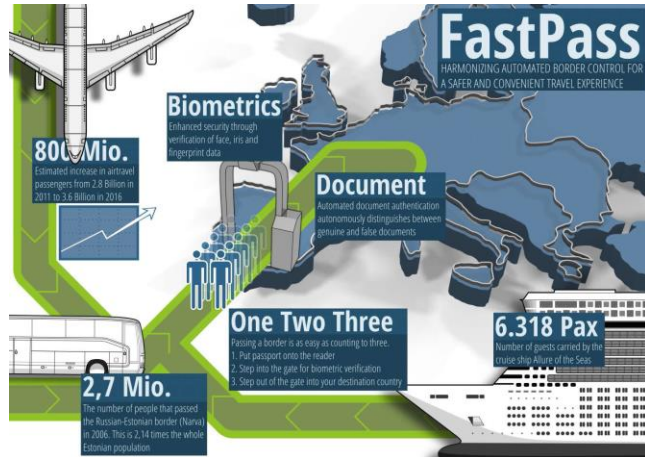
Anzahl der Reisenden ↑

Anforderungen an den Grenzkontrollprozess ↑

Risikobewertung ?

Harmonisierung ?

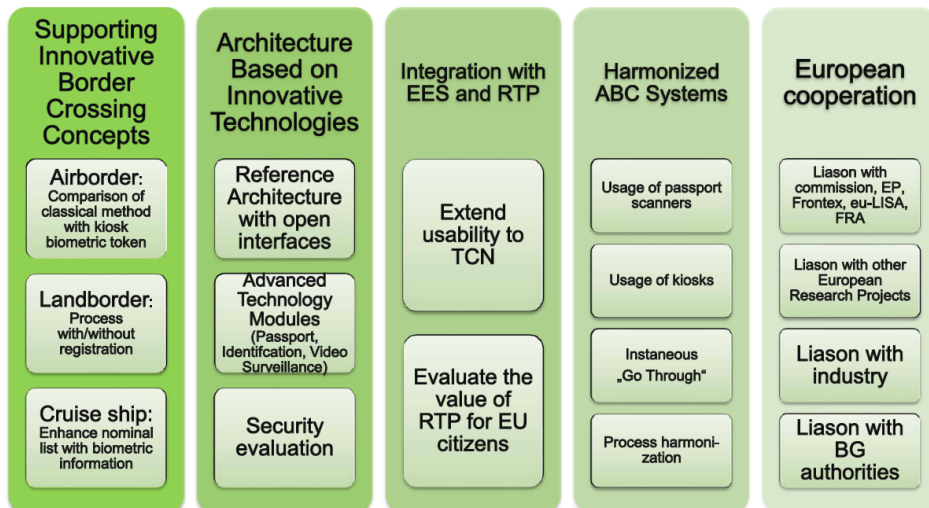
Benutzungsvarianten ?



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FastPass Objectives

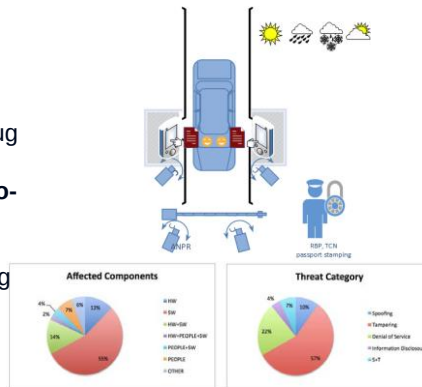


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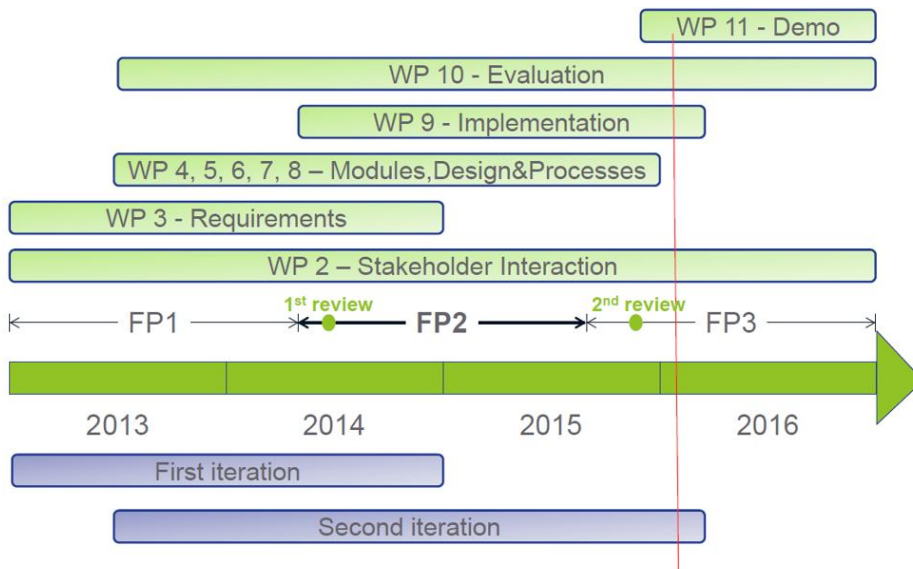
Haupt-Ergebnisse

- **Sensoren, Konzepte, Algorithmen und Software der nächsten Generation**
 - Biometrische Identifikation, Geschwindigkeit, Qualität, reduzierte Beeinflussung, "Counter Spoofing", Kosten
- **Innovative Szenarien, harmonisierte Architekturen**
 - Mehrere Luftgrenzen-Szenarien, Seegrenzen-Szenario, Landgrenzen-Szenario mit im Fahrzeug verbleibenden Reisenden
- **Methodologie für eine holistische Risiko- und Sicherheitsbewertung**
 - Liste mit Bedrohungen, Typisierung, Einfluss, Verwertung und Entschärfung



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Zeitachse



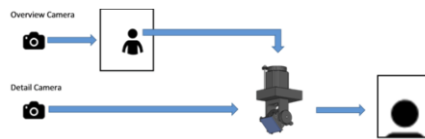
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On-the-move-Gesichtserkennung



Neuartige Gesichtserkennung:

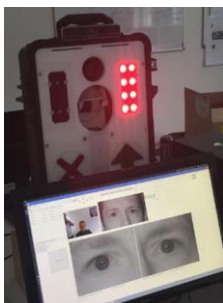
- Sichtfeldsteuerung der Kamera durch Hochgeschwindigkeitsspiegel
- Gerät bewegt sich in Gehrichtung über dem Gate
- Adomo® Kameras für Gesichts- und Iris-Erfassung höhenverstellbar von 1,2 bis 2,2 m
- **Herausforderung:** für die Gesichtserfassung schauen die Reisenden nicht auf die Kamera, stehen aber nahe am Sensor
- **Lösung:** das Vergleichsbild wird durch eine Folge von Einzelbildern erzeugt (10+ Bilder)
- Kann für die Land- und Seegrenzen-Szenarien installiert werden
- **Ergebnisse:** Über 700 Kontrollen pro Stunde statt bisher 150



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Iris-Erkennung, Prototyp



Gegenwärtige Herausforderung am Markt:

- Zwei Gruppen von Iris Kameras
 - 1) Distanz bis zu 0.5 m, Kostenrahmen € 1-5k, erfordern Mitarbeit des Anwenders
 - 2) Distanz bis zu 2m, Kostenrahmen € 15-40k, erfordern weniger Mitarbeit

Ziele:

- Größere Detektionsentfernung
- Höhere Benutzerfreundlichkeit
- Deutlich geringerer Preis

Lösung:

- Erfassungsabstand 1.5m x 2m (Adomo®-Spiegel)
- Neue Iriserfassungskamera
- Als Token verwendbar
- Minimale Benutzermitarbeit
- Wird als Kiosk eingesetzt
- Preis: ca. €5k

Künftig:

- Reduktion der Spiegelgröße
- Größere Flexibilität bei der Integration

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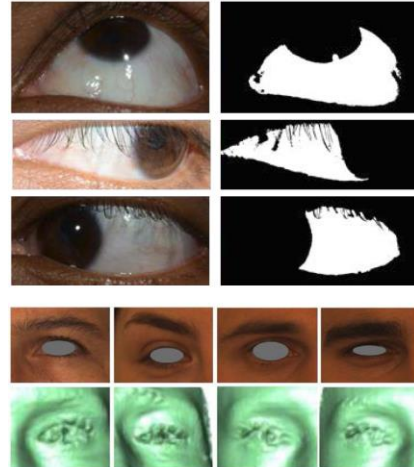
Sclera-Segmentierung und periokulare Erkennung

Sclera Segmentierung:

- 1. Platz beim BTAS 2015 Wettbewerb – “Sclera Segmentation Benchmarking Competition”
- Zweistufige Klassifikation mit selbstlernendem Algorithmus
- Robust gegenüber Änderungen bei Beleuchtung und Hautfarbe

Periocular Erkennung:

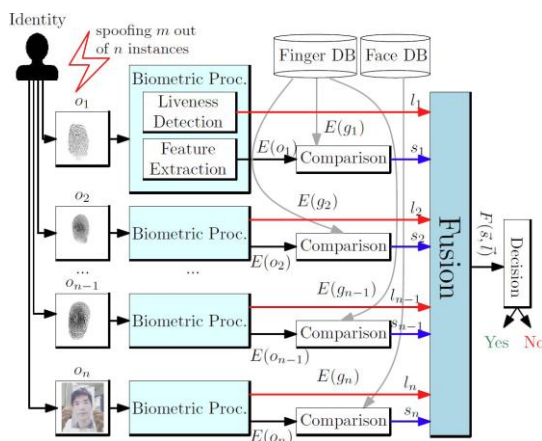
- Identifikation basierend auf Augenfeld
- Fusion: 2D-Textur und 3D-Form
- Evaluierung unter erleichterten Bedingungen: Gesichtsausdruck, Kopfposition und –orientierung, Teilverdeckung
- Ergänzung zu Gesichts- und Iriserkennung



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Spoofing-unempfindliche multimodale Fusion von Gesicht und Fingerabdruck



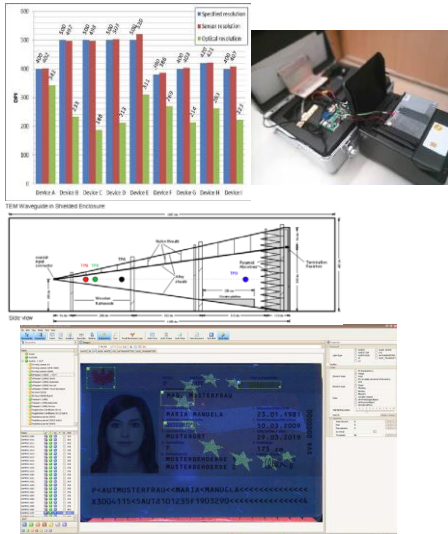
Beitrag:

- Erweiterung des Multi-Fingerprint + Anti-Spoofing-Framework (IJCB'14) mit Multimode-Funktion
- Neue Anti-Spoofing-Algorithmen, verbesserte Performance
- Weitere theoretische Präsentationen der Methoden

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Dokument-Authentifikation



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Interoperabilitätsanalyse

- Vergleich von Sensoren und Hardware
- Analyse der Dokumentalterung und Verformung
- Messung des Beleuchtungsspektrums

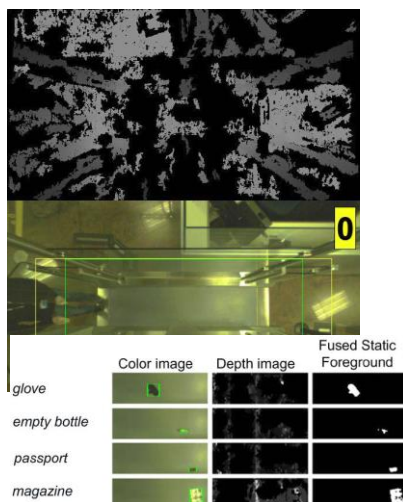
Sicherheitsanalyse

- Dokument-Simulator
- IEMI-Analyse und Verbesserungen

Besondere Eigenschaften:

- Vergleich der optischen Information mit den elektronischen Daten
- Verwaltungseinheit zur detaillierten Template-Erstellung
- Dokumentenprüfungen auf unterschiedlichen Ebenen

Personenvereinzelung / Detektion abgelegter Objekte



Erweiterte 3D-Objekt-Detektion durch das Stereo-Kamera-System vom AIT

- Optimiertes Stereo-Matching
- WVGA -Auflösung (608x328), Tiefenauflösung 2 cm

Jeder Algorithmus verwendet die passendensten Daten:

- Personentrennung: Tiefeninformation + Kopf-Schultern-Modell
- Gegenstandsdetektion: Fusion von Farbtrennung und Hintergrundschätzung

Weitere Steigerung der Robustheit durch zeitliche Integration und Synchronisation mit den Türsignalen des Gates



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Schlängelänge



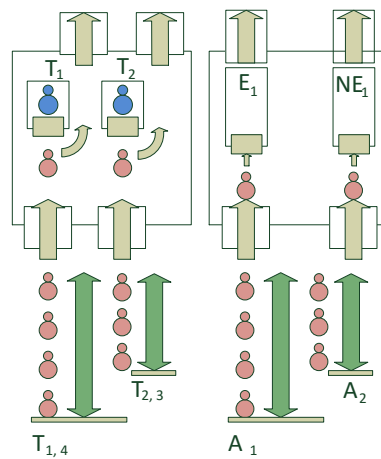
Länge der Schlangen

- Tiefensortierung der Personen
- Robust gegen Änderung der Beleuchtung und Schatten
- Ermöglicht Szenenanalyse

Wartezeit

- Vergleich tatsächlich / geschätzt
- Ermöglicht Warteschlangenmanagement

Warteschlangenoptimierung



Optimierungsszenario

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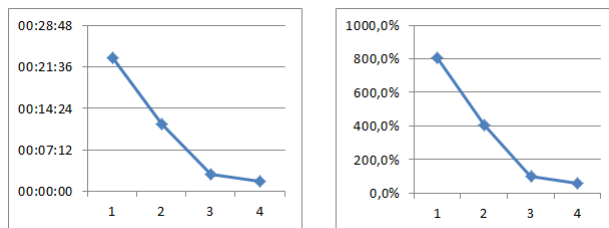
Zweck: Optimierung der Gate-Konfiguration und der Warteschlangenverteilung

Eigenschaften:

- **Schätzung der Parameter der Reisenden basierend auf den Fluginformationen**
 - **Bestimmung der optimalen Gate-Konfiguration und Warteschlangenverteilung**
 - **Simulation eines realistischen Szenarios**
-

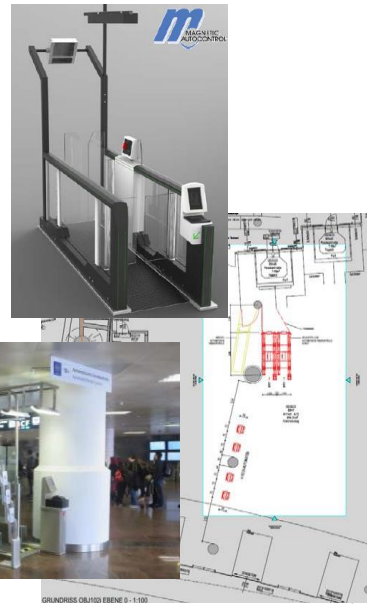
19.02.2016

Ergebnisse



Reduktion: 41,7 % der “normalen” Dauer

- Operationeller Test in Wien / Schwechat
- Vergleich unterschiedlicher installationen
- Documente: ePassports
- Reisende:
 - Stufe 1: EU/EEA/CH
 - Stufe 2 +3: + TCNVH, + TCNVE
- Biometrie:
 - Gesicht (all Stufen)
 - +Fingerabdruck (Stufe 2), +Iris (Stufe 3)
- RTP (Stufe 3) wird simuliert (Veridos)



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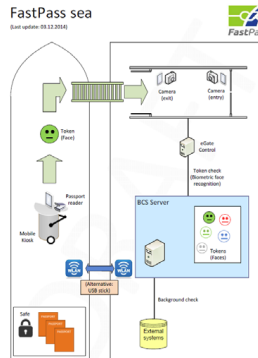


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Demonstration und Test im Hafen von Piraeus
 Dokument-Authentifikation
 Passagier-Authentifikation and Identifikation (1 :n)
 Dokumente: ePassports
 Reisende: EU/EEA/CH, TCNVH, TCNVE
 Biometrie:
 Gesicht (+ Iris als Test)



RTP wird simuliert



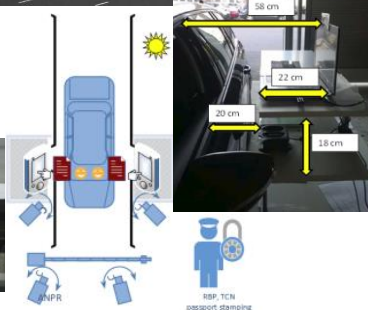
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Demonstration in Moravita
 Ausreisekontrolle für Vielreisende
 Versorgung mit ID-Dokumenten
 Fahrzeugdokumenten
 Fahrerlizenzen



Bewegliche Terminals
 ANPR zur Fahrzeugdetektion
 Fahrer- und Beifahrerkontrolle
 Zollkontrolle, Mitfahrerkontrolle und
 Stempelprozess manuell



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Ausblick

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FastPass – Das System, das

- **...sicher ist**
 - Resistent
 - Gegen jüngste Angriffe auf den Dokumentenscanner
 - Gegen "biometric spoofing"
 - Risiko-Bewertung, Sicherheits-Bewertung durch speziell entwickelte Methodik
- **...Sie mögen**

Benutzerführung entwickelt unter Mitarbeit europäischer Grenzbeamter
Entwicklung des Gesamtprozesses mit der Bewertung durch Reisende
Privatsphäre und Datenschutz: speziell entwickeltes Datenschutzmanagement
- **...harmonisiert ist - und neue Prozesse und Szenarien zeigt**

EINE Referenzarchitektur für viele Prozesse
Erste Europäische Lösung für Autos an Landgrenzen mit ABC
Erste Lösung für Kreuzfahrtschiffe
Echter Vergleich verschiedener Lösungsansätze an einer Luftgrenze

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Verbreitung

Type	
Artikel in Journalen oder Konferenzbänden	25
Präsentationen über das Projekt auf Konferenzen	54
Workshops (darunter 4 von FastPass organisiert)	15
Presseartikel in Spezialmagazinen	18
Wissenschaftliche Arbeiten	2
Messestände (darunter 6 mit Demonstrationen)	10
Videos	3
Newsletters	8
Blogs	4
Verbreitungsaktivitäten gesamt	139



Research project conferences
2014, 2015 and 2016



Presentations at Passenger
Terminal Expo, Secure
Document World and other
conferences



Organizing
1st International
Workshop on
Identification
and Surveillance
for Border
Control (ISBC
2015)



Journal Paper in



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Danke für die Aufmerksamkeit!

Fragen?

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