VISUAL SURVEILLANCE AND INSIGHT
MAKING SENSE OF ABUNDANT VIDEO DATA

MOTIVATION

The protection of citizens is one of today's biggest societal challenges. Public locations such as airports and subway stations are equipped with numerous cameras in order to enhance the security of people and infrastructure. In order to cope with the huge amount of generated video data, we develop advanced visual surveillance systems which enable insight and the automatic extraction of security-relevant information.

In our research and development we focus on

▶ Object detection and tracking
▶ 3D reconstruction and multi-view geometry
▶ Stereo cameras and multi-camera networks
▶ Embedded vision systems

COLLABORATIVE RESEARCH

AIT experts in this research field work in close collaboration with video component and security solution suppliers. Furthermore, we are heavily involved in cooperative research projects with infrastructure operators and public authorities at the national and European level.

Video surveillance inherently needs to strike a balance between the need for public security, on the one hand, and privacy protection, on the other. Technological approaches such as a strict "Privacy by Design" concept can only provide partial answers to this challenge. Accompanying social studies as well as careful consideration of legal and ethical aspects play a crucial role for the acceptance of vision technologies. Moreover, it is essential that the public has clear information about how these systems and the resulting data are used.
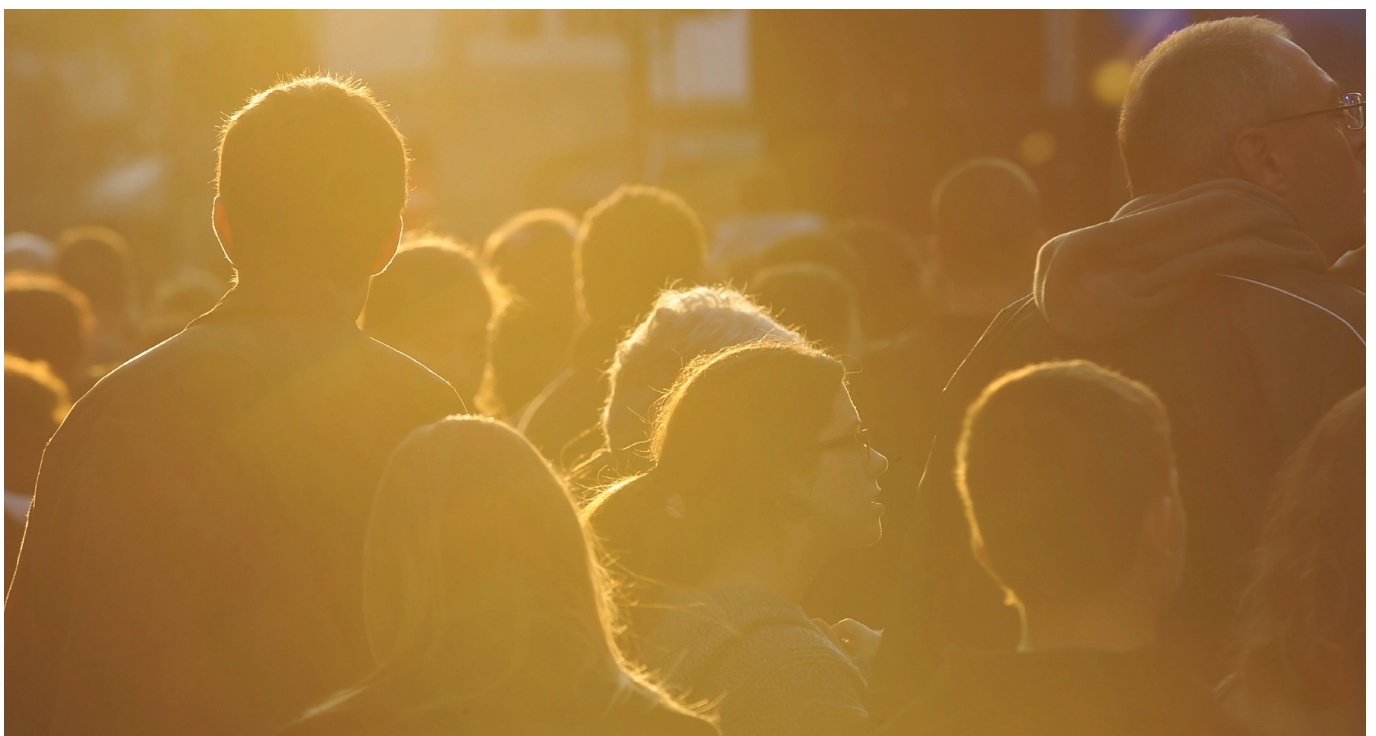
Visual Surveillance and Insight
EXPERTISE AND COMPETENCIES

MULTI-CAMERA VISION

We combine multi-camera networks with advanced computer vision algorithms to develop innovative solutions for a broad range of applications in surveillance as well as border control, passenger facilitation, traffic management and business intelligence. Our research covers the whole processing chain from image and video acquisition over several steps of analysis and information extraction up to the user-friendly presentation of results. Our development is based on platform-independent service-oriented architectures and professional software engineering, from the design to testing and validation.

Object Detection and Tracking

▶ 3D detection and tracking of persons and objects
▶ Object recognition in camera networks
▶ People counting and tracking in crowded scenes
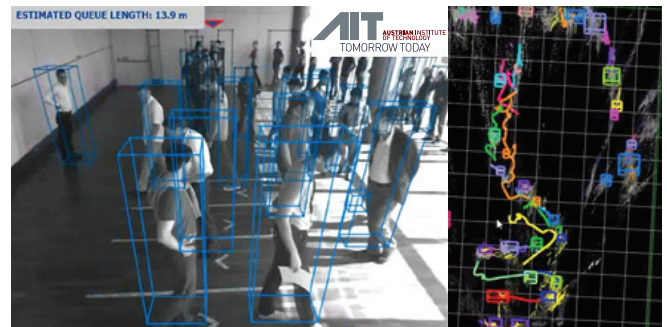
3D Reconstruction and Multi-View Geometry

▶ Structure from Motion, Simultaneous Localization and Mapping
▶ Camera calibration for overlapping and non-overlapping camera networks
▶ Indoor localization and navigation
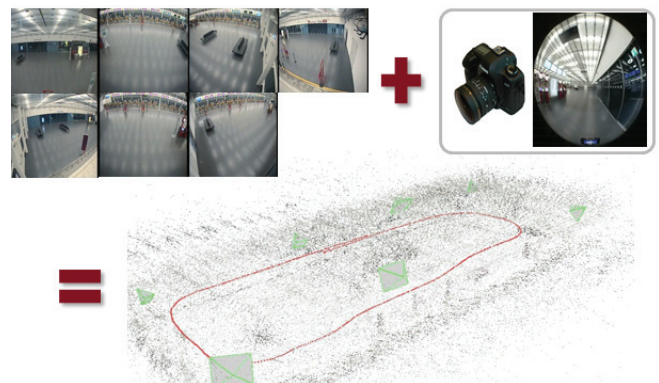
Machine Learning

▶ Image segmentation and scene analysis
▶ Video content analysis

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EMBEDDED VISION SYSTEMS

Based on our 25 years' experience in embedded hardware and software engineering, we are able to develop market-ready solutions of intelligent vision systems, considering specific requirements such as processing speed, power consumption, or production costs. This encompasses the design of heterogeneous hardware architectures, combining various processing units (ARM processors, GPUs, FPGAs), as well as the development of optimized code for these platforms.

Design and Development of Embedded Systems

▶ System design using latest hardware components
▶ Sensor interfacing
▶ Development toolchain for host and target
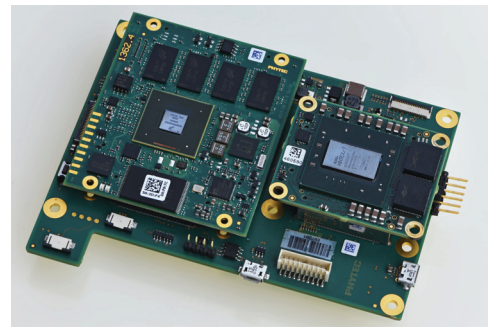
Hardware Design

▶ Component selection, according to application-specific requirements
▶ Electromagnetic compatibility
▶ Stereo cameras and multi-camera networks

Embedded Software Engineering

▶ Embedded image processing, e.g. stereo matching
▶ Optimization with respect to speed, power consumption, size, cost etc.
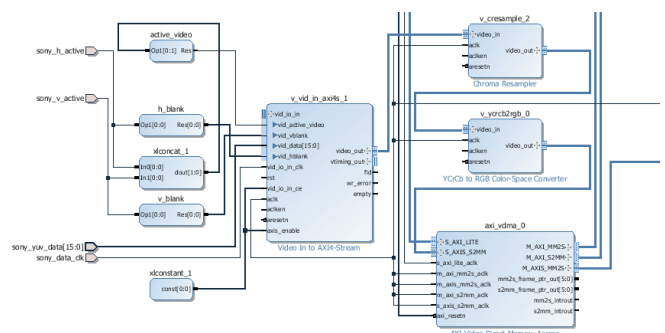
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OUR PORTFOLIO

We provide leading-edge technology to strengthen our customer's market position. Our services span the whole innovation process, starting from application-oriented research, design of intelligent vision algorithms and system concepts, up to prototype and product development.

We offer:

▶ Design of vision algorithms and system concepts
▶ Technological expertise, feasibility studies and proof of concepts
▶ Hardware and software architectures for various platforms
▶ Contractual hardware and software development
▶ Technologies under license
▶ Prototypical implementations, demonstration and system verification
▶ Performance evaluation and optimization of products and systems
▶ Creation and management of multi-lateral cooperation projects
▶ Access to research funding at national and EU level

REFERENCE PROJECTS

Industrial Reference Projects:

▶ Funkwerk video systeme: HD H.264 surveillance camera and multichannel encoder
▶ PKE Videosysteme: Development and delivery of several thousand video encoding channels (PCI boards, encoders and software modules) for surveillance (e.g. Vienna Underground)
▶ TITAN Electronics: Access Control Systems, embedded multichannel video encoder and object detection algorithms
▶ IEE: FPGA Embedded Stereo Vision
▶ Philippeit GmbH: Biometric Access Control

National and European Funded Projects:

▶ Passenger Monitoring in a large Network of Airport Surveillance Cameras (PAMON)
▶ MobilePass - a secure, modular and distributed mobile border control solution for European land border crossing points
▶ FastPass - a harmonized European border control system
▶ Embedded Multi-Core systems for Mixed Criticality applications in dynamic and changeable real-time environments (EMC2)
▶ Privacy by Design Surveillance Framework (PARIS)
▶ Analysis System for Gathered Raw Data (ASGARD)
▶ Visual localization for smart indoor Logistics (LoLog)
▶ Robust Sensor Systems for Advanced Traffic Applications (RoSSATA)
▶ Localizing Assistant Robots At Home (LARAH)
▶ Border guard for safe, secure, fast and reliable border access (BODEGA)

CONTACT

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