



Distributed Events Analysis Research Laboratory

Head of department:
Dr. Tamás Szirányi

Phone:
+36 1 127 6106

E-mail:
tamas.sziranyi@sztaki.mta.hu

Address:
H-1111 Budapest, Kende u. 13-17.

Web:
eee.sztaki.mta.hu/en

INTRODUCTION

The goal of the DEVA group is the interpretation and organization of information coming from distributed multimodal sensors, related to computer vision, machine learning on big multimedia data, graph theory, human perception, geometrical optics and remote sensing. The challenge is the evaluation, recognition and classification of events occurring at different locations or time, detected by sensors in dynamic networks.

MAIN R&D TOPICS

- Pattern and event detection and recognition
- Earth observation, remote sensing
- 3D scene analysis and LIDAR measurement technology
- Ontology based classification and indexing of multimedia events
- Recognition and tracking of biometric features
- UAV based image and video analysis
- Simultaneous Localization and Mapping implemented on moving or flying vehicles
- Energy based image and video segmentation
- Stochastic models and learning methods for event analysis
- Automatic camera registration, event matching in multiple views, optics-oriented image interpretation
- Self-organizing distributed sensor networks and related calculations, operation optimization
- Cognitive vision problems in visibility, compression, recognition, visualization of artistic effects
- Detection and removal of artefacts from still images: shadow regions, reflections, undesired objects
- Surveillance related modelling and recognition

By spatial-temporal analysis of information we recognize and classify events. These events are e.g., unusual motion patterns, behavioural changes in time series. We place special emphasis on machine learning, data mining, human perception, geometrical optics, multimodal sensor fusion, optimization methods and variation analysis in areas such as image and video processing, biometrical identification, connections with sensor networks and computer graphics.

The measured environment may change in time, and a different viewpoint of a given sensor may produce a set of features that are different from others originating from other arrangements, even if using the same modality. Our goal is to obtain semantic interpretation of the scenes surveyed by such networks, characterizing their geometrical or statistical relations and to form more effective collaborations among them. We work on new methodologies for self-organized sensor networks which work without real physical control of freely moving agents.

INDUSTRIAL SOLUTIONS

- Satellite and airborne image data analysis for remote sensing applications
- LIDAR based 3D scanning, sensor fusion and modelling tasks
- Image analysis and multimodal fusion algorithms for autonomous driving
- Design and implementation of algorithms and system prototypes for the reconstruction and visualisation of complex spatial-temporal scenes by integrating various types of sensor measurements
- Adaptable security surveillance suites
- UAV based surveillance and 3D modelling
- Integrated customer area monitoring modules suitable for event detection

INTERNATIONAL REFERENCES

- Intellio Ltd.,
- Tateyama Ltd,
- Vitrociset s.p.A (Italy)
- Bosch GmbH
- INRIA (Sophia Antipolis, France)
- University Bordeaux
- Bilkent University
- Università Federico II di Napoli,
- University of Konstanz
- Vienna University of Technology
- KEMEA Center for Security Studies
- UNIBWM Universität der Bundeswehr München
- CMR Consorzio Milano Ricerche
- Hungarian National Security Service (NBSZSZ)
- Ministry for Justice and Law Enforcement (IRM)
- National Instruments Hungary
- HEXIUM Technical Development Co.
- Budapest University of Technology and Economics
- Centre for Budapest Transport (BKK) Geo-information Department
- Budapest University of Technology and Economics
- Pazmany Peter Catholic University
- University of Pannonia
- zLense (Zinemath)

MAJOR PROJECTS

- EDA/MAPIS: Multichannel passive ISAR imaging for military applications
- ESA/DUSIREF: Dynamic Urban Scene Interpretation and REconstruction through remotely sensed data Fusion
- SCOPIA: Medical image processing for endoscope diagnosis VKSZ_14
- OTKA K 106374: Finding Focus of Interest in freely configured sensor networks
- PROACTIVE (EU FP7): PRredictive reasOning and multi-source fusion empowering AntiCipation of attacks and Terrorist actions In Urban EnVironmEnts
- Innovative research and development: on-board camera systems in vehicles; in collaboration with Robert Bosch Ltd
- zLense –3D and 4D R&D tasks for video studios
- BKK - Software for evaluating data of mobile traffic data collection system
- i4D – design and implementation of a pilot system for the reconstruction and visualisation of complex spatial-temporal scenes by integrating two different types of data

MAIN DOMESTIC REFERENCES

