IMAGE PROCESSING AND PATTERN RECOGNITION RESEARCH CENTER

Contact details

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Areas of expertise

- **Image processing and pattern recognition**: -Color, grayscale and 3D image processing; Automatic image and media annotation
- **Stereovision based sensorial perception**: Stereovision; Dense optical flow; Object detection, classification and tracking; Real-time computer vision
- **Object detection, classification and tracking**: use of deep learning and probabilistic model-based techniques for object detection, classification and tracking from grayscale, colour and 3D information
- **Advanced driving assistance and Autonomous mobile systems**: -Sensorial perception; Environment representation; Risk assessment, Autonomous vehicles. Autonomous drones
- **Medical image analysis**: -Enhancement; Segmentation; Recognition; Prediction; Structured reporting; Ultrasonography, CT, MRI

Team


Representative projects

- **MULTISPECT**, “Multispectral environment perception by fusion of 2D and 3D sensorial data from the visible and infrared spectrum”, code PN-III-P4-ID-PCE-2016-0727, (2017-2019), [https://cv.utcluj.ro/multispect/](https://cv.utcluj.ro/multispect/)
- **Road surface measurement and modeling**, funded by Rober Bosch GMBH, (2013-2016)
Significant results

The most representative publications of the past 5 years:


Significant solutions:
High accuracy dense stereovision; High accuracy dense optical flow; Stereovision based ego-motion estimation; Lane detection and tracking; Detection and classification of painted road objects; Obstacle detection and tracking; Obstacle classification; Perception & representation of unstructured environments; Forward collision detection; Dynamic environment perception; High level reasoning on perception and domain knowledge; Automatic image annotation; Omnidirectional stereovision, Deep learning based detection, semantic segmentation, panoptic segmentation; Spatio-temporal and appearance based representation of 3D environment.

Products and technologies:
1. Real-time stereovision-based perception solution for highways
2. Real-time stereovision-based sensorial system for city driving assistance functions
3. Real-time stereovision-based advanced driving assistance for cooperative intersection safety
5. Ground-base long baseline observation system for automatic detection and ranging of low Earth Orbit objects.
6. Automatic visual annotation system
7. Medical diagnosis assistance system based on ultrasonic image texture analysis, for detection of diffuse diseases, malign and benign liver tumours, prostate cancer
8. Omnidirectional stereovision for surrounding perception used for robotic applications
9. Spatio-temporal and appearance based representation for environment representation
10. Panoptic segmentation solutions

The offer addressed to the economic environment

Research & development Sensory perception based on 3D depth sensors and colour cameras: organization, identification and interpretation of the sensory information for environment representation and understanding.
Advanced driving assistance and Autonomous mobile systems: environment perception and representation, risk assessment, planning.
Medical imaging: textural analysis, probabilistic segmentation and machine learning for assisted diagnosis from ultrasonography and tomography.

Consulting Consulting, design, research and prototyping towards development of 2D and 3D sensors based solutions for multiple industrial and scientific fields, autonomous mobile systems.

Training Image processing, Pattern recognition, Deep Learning, Perception, Autonomous mobile systems.