

CHALLENGES

Smart, green and integrated transport

The Industrial Problem

Automated situation analysis based on multiple sensorial measurements is a key issue in several smart city applications, including autonomous driving, surveillance, crowd analysis, traffic management and control and state assessment of public premises.

AUTOMOTIVE INDUSTRY, SURVEILLANCE,

Research
group

University of Debrecen

Department of Computer Graphics
and Image Processing



Main research fields: image processing, geometry, computer graphics, big data, machine learning, deep learning, geoinformatics features of your research group

Company

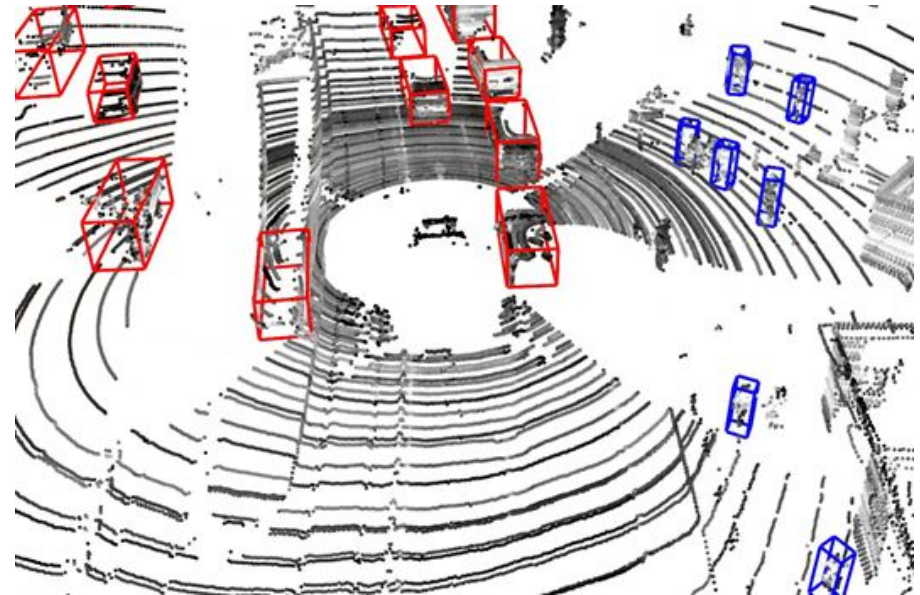
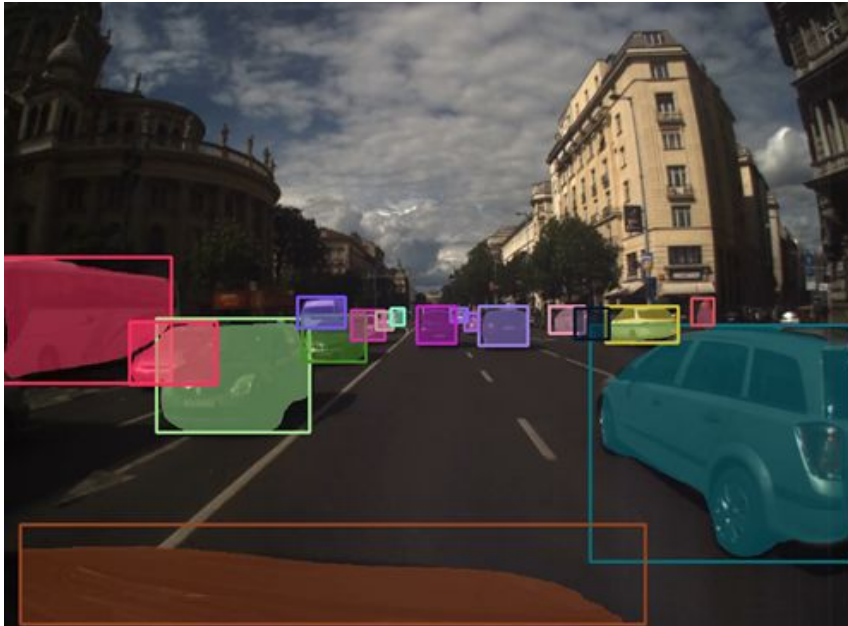
IP Camp Ltd



IP Camp is a German/Hungarian company working on automotive software development projects and product development, performance cloud computing applications, also covering automated driving and AI topics.

Challenges & Goals

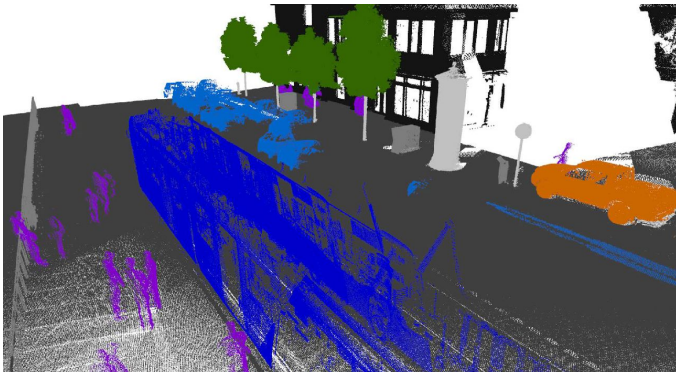
- Enhancing AI based object recognition from Lidar measurements
- Exploitation of high density point cloud maps for navigation and situational analysis
- To optimize camera-Lidar fusion algorithms
- Extending the methods to further applications



Include a text indicating what the images represent

Mathematical and computational methods and techniques applied

- Research on Bayesian classification and geometry based modeling techniques (Markov random fields, Marked Point Processes)
- Application of deep learning techniques, development of new neural network architectures
- Fusion of classical and AI based modeling approaches
- Decision techniques for fusing machine learning and probabilistic approaches.



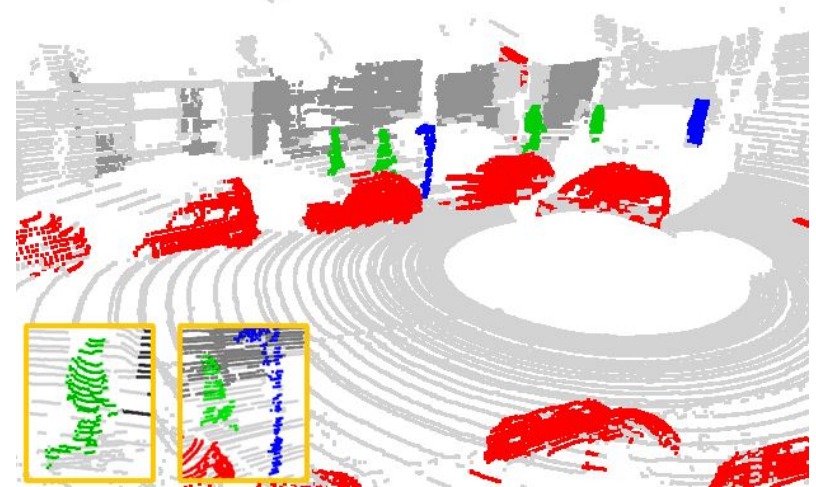
AI based automated map segmentation



Lidar-camera calibration

Results & Benefits to the company

- Results
 - New AI based object detection approach for camera images and Lidar point cloud streams
 - New building classification method using images (based on function and style)
 - New targetless fully automatic camera-Lidar calibration technique
- Benefits
 - Technology demonstrators for future advanced AI projects



Lidar based object detection and situation analysis

The proposed multi-sensorial solutions provide higher level of automation and reliability of environment perception