# Lane modelling algorithm for video-based ADAS

HU-MATHS-IN
Hungarian Service Network for Mathematics in Industry and Innovations

**The Industrial Problem**

Robert Bosch Kft was interested in a dynamic process for ADAS (Advanced driver assistance systems), which computes the lanes continuously and directly from the data of a stereo-camera and giving a lane model based on only these data.

*Research group*

**University of Szeged**

Graph theory, discrete geometry, statistics, computer-aided modelling, algorithms, machine learning, programming, psychology.

*Company*

**Robert Bosch Kft.**

BOSCH
Invented for life

The Bosch Group is a leading global supplier of technology and services.

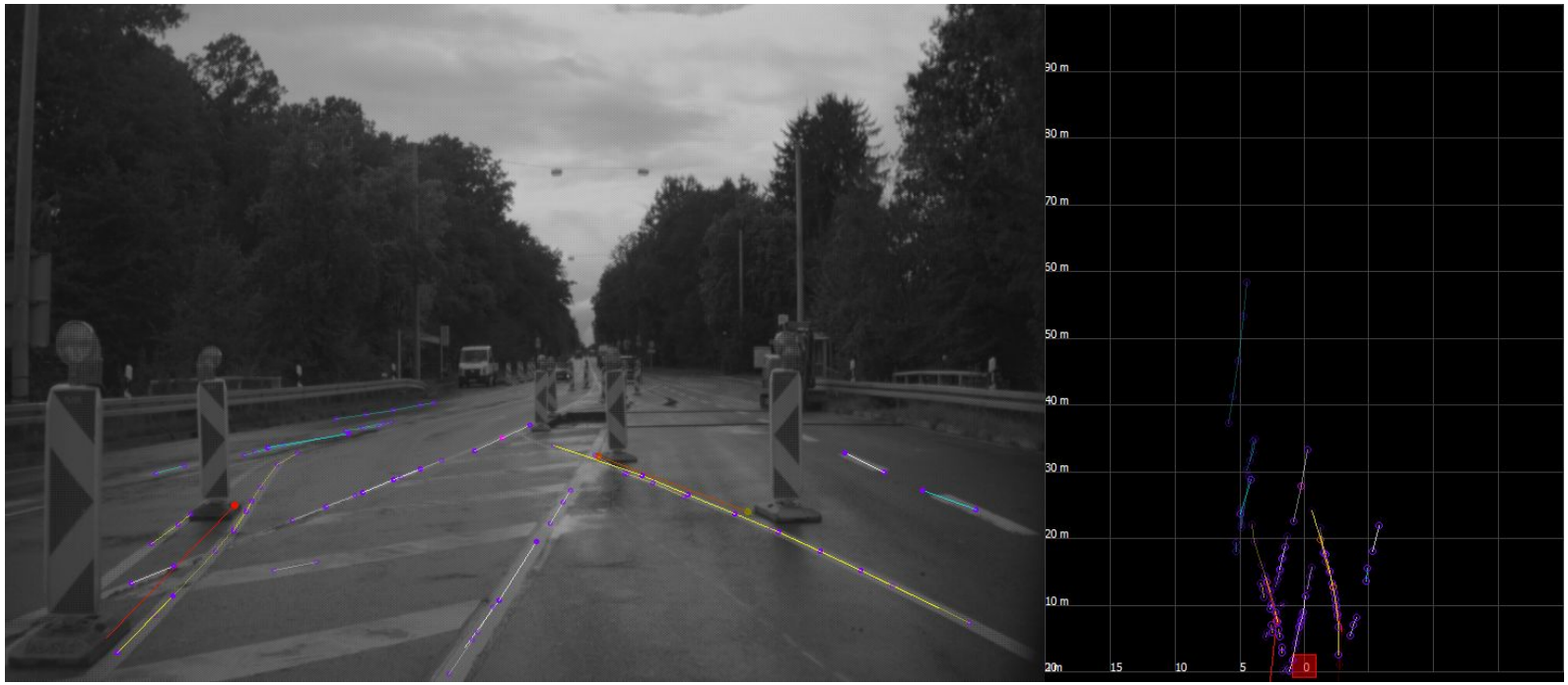
SZÉCHENYI 2020
MAGYARORSZÁG KORMÁNYA
Európai Unió
Európai Strukturális és Beruházási Alapok
BEFEKTETÉS A JÖVŐBE

# Lane modelling algorithm for video-based ADAS

HU-MATHS-IN
Hungarian Service Network for Mathematics in Industry and Innovations

## Challenges & Goals

- To identify all possible lanes in the data images
- To implement in embedded framework
- To guarantee small computing capacity
- To optimize the consistency of the lane model



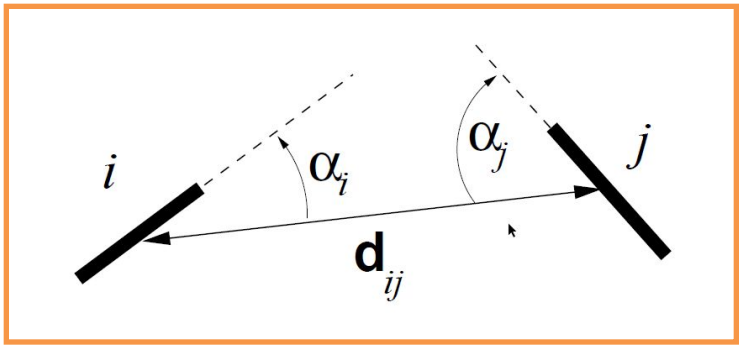
# Lane modelling algorithm for video-based ADAS

HU-MATHS-IN
Hungarian Service Network for Mathematics in Industry and Innovations

**Mathematical and computational methods and techniques applied**

- Probabilistic grouping fields (handling connectivity of line segments)
- Principles of Gestalt psychology
- Graph theory (modelling the similarity)
- Clustering methods: threshold method and spectral clustering

*Parameters for similarity of segments*



# Lane modelling algorithm for video-based ADAS

HU-MATHS-IN
Hungarian Service Network for Mathematics in Industry and Innovations

## Results & Benefits to the company

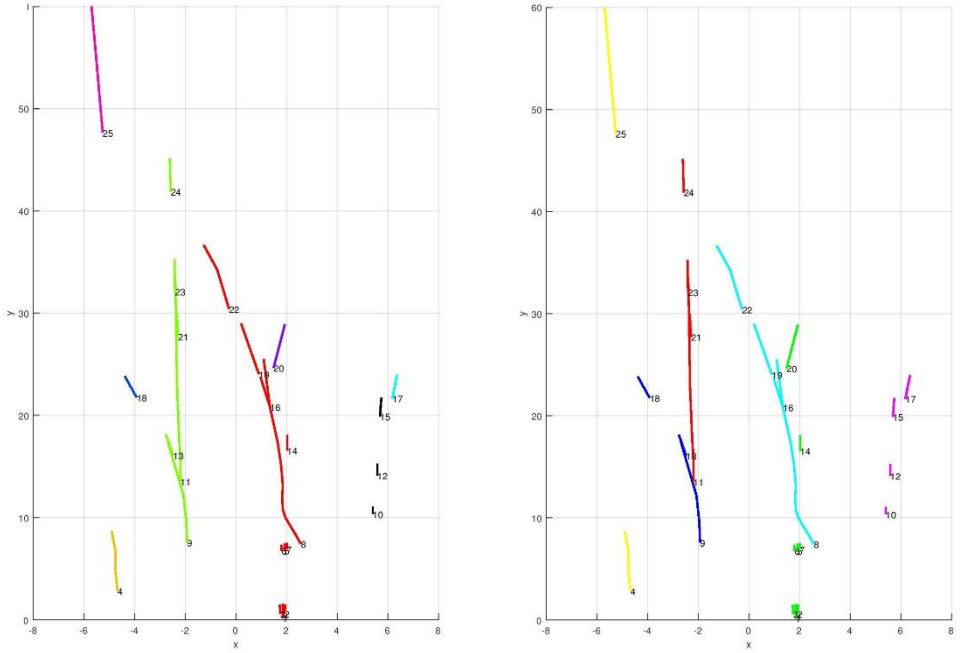
### Threshold method:

- Easy to implement
- Efficient runtime
- Number of clusters are computed automatically and dynamically
- Loss of information

### Spectral clustering:

- More info is used
- #Clusters is input

These algorithms can be combined.



*Result of Algo #1 and Algo #2*

The company has efficient clustering algorithms for the lane model problem.