LANE MODELLING ALGORITHM FOR VIDEO-BASED DRIVER ASSISTANCE SYSTEM

CHALLENGES: safe and collision-free driving

PRODUCTIVE SECTOR: self-driving cars

PROBLEM DESCRIPTION

An autonomous car is a vehicle that is able to sense environmental data and to navigate based on them without any human action. Advanced driver assistance systems (ADAS) are electronic devices which help the drivers during the process of driving. One of the most important task of an ADAS is managing the data produced by a sensor.

CHALLENGES

AND GOALS

There is currently no reliable algorithm for road reconstruction because the situation is much more complicated than in a highway environment. The main goal is to develop a dynamic process, which computes the lanes continuously and directly from the data of a stereo-camera and give a lane model.

MATHEMATICAL AND COMPUTATIONAL METHODS

Our approach to this problem is clustering. The input is a graph, whose vertices are the points of the road markings given by the pre-segmentation method. This data can be put into a Cartesian coordinate system, so we can work with the coordinates of points and the polygonal paths between them. We use a normed similarity function on the segments in order to use probabilistic methods. Our first algorithm uses a simple threshold method and the second one uses Jordan's and Weiss' spectral clustering method on the edge-weighted similarity graph.

Results and Benefits

The two figures show the resulting clusterings of a sample data. The comparision of the two algorithms on several test cases does not suggest that one of the algorithms should be preferred. With the popular and faster threshold method, a lot of information can be lost, and the theoretical investigation of spectral clustering suggests, that it should be better.
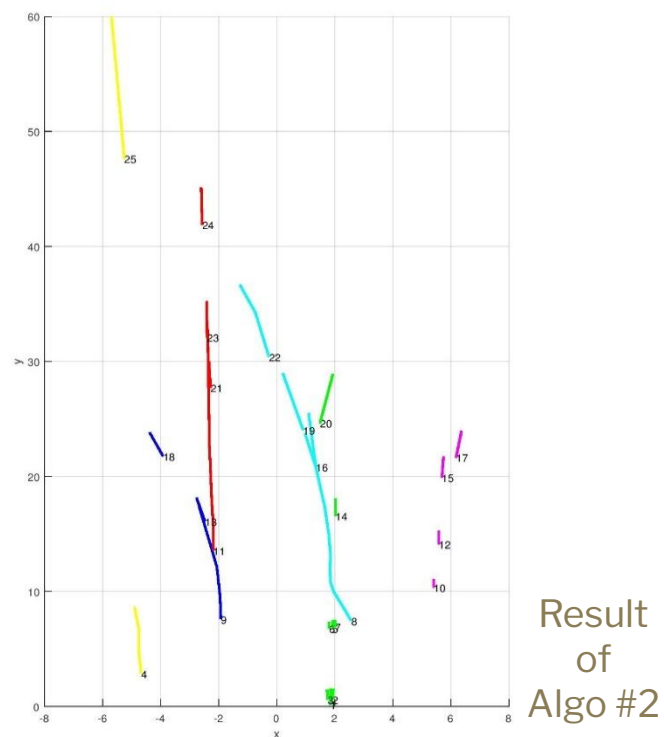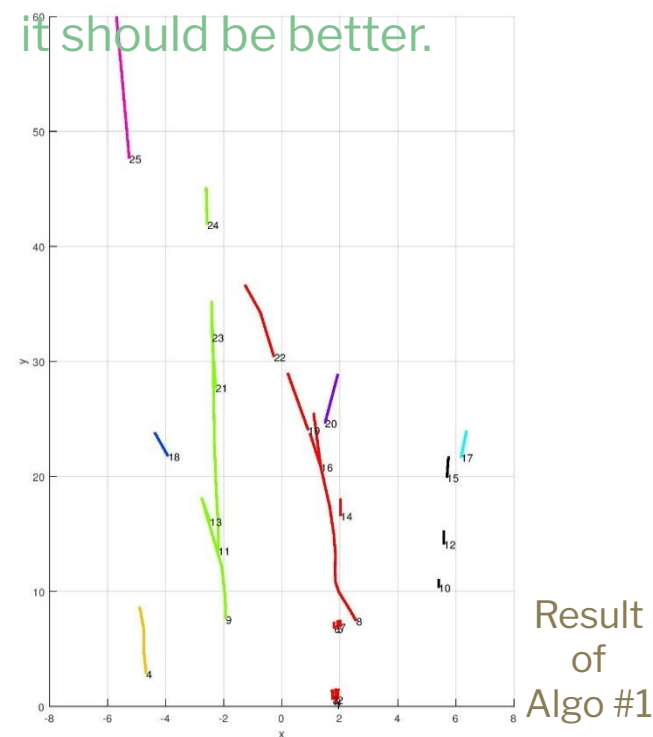
Increase the **effectiveness of ADAS** (Advanced driver assistance systems) in supporting **safe driving**

Result of Algo #1

Result of Algo #2

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