

Road scene understanding from multisensorial data

Ecole doctorale
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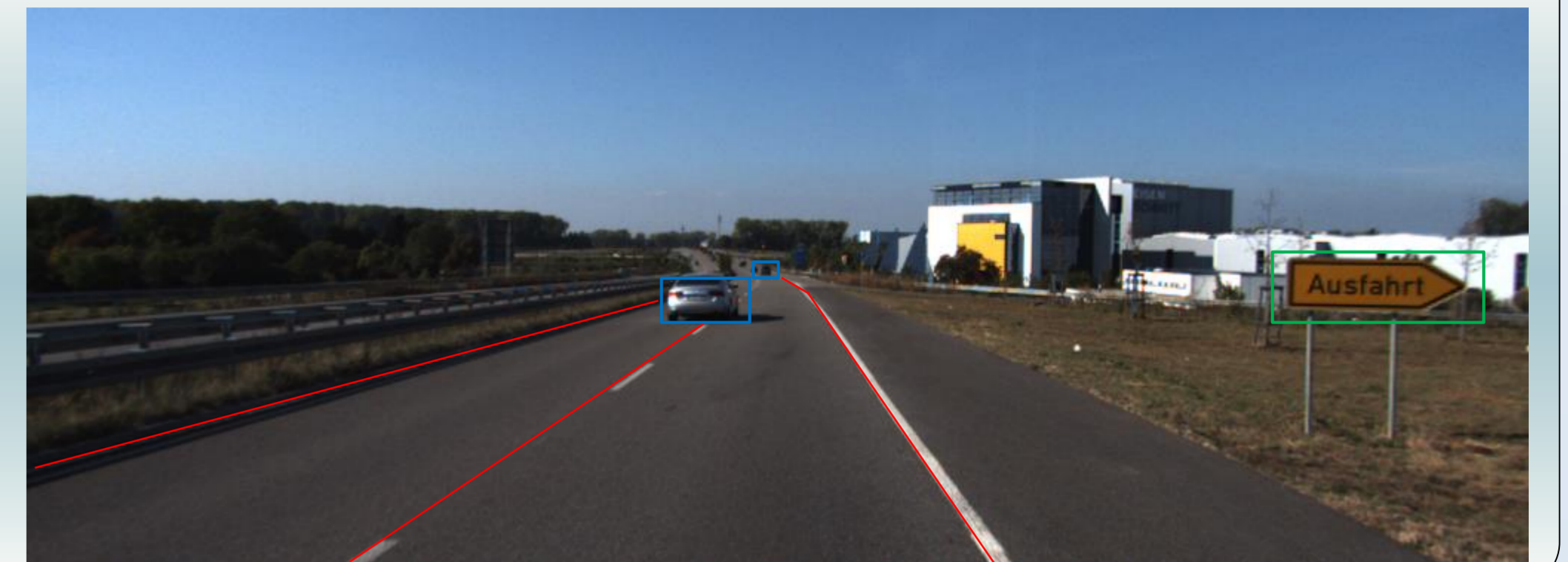
Abderrahim KASMI ^(1,2), Dieumet DENIS ⁽¹⁾, Romuald Aufrère ⁽²⁾, Roland CHAPUIS ⁽²⁾

(1) Sherpa Engineering, 12 Avenue de Verdun 1916, 92250 La Garenne-Colombes

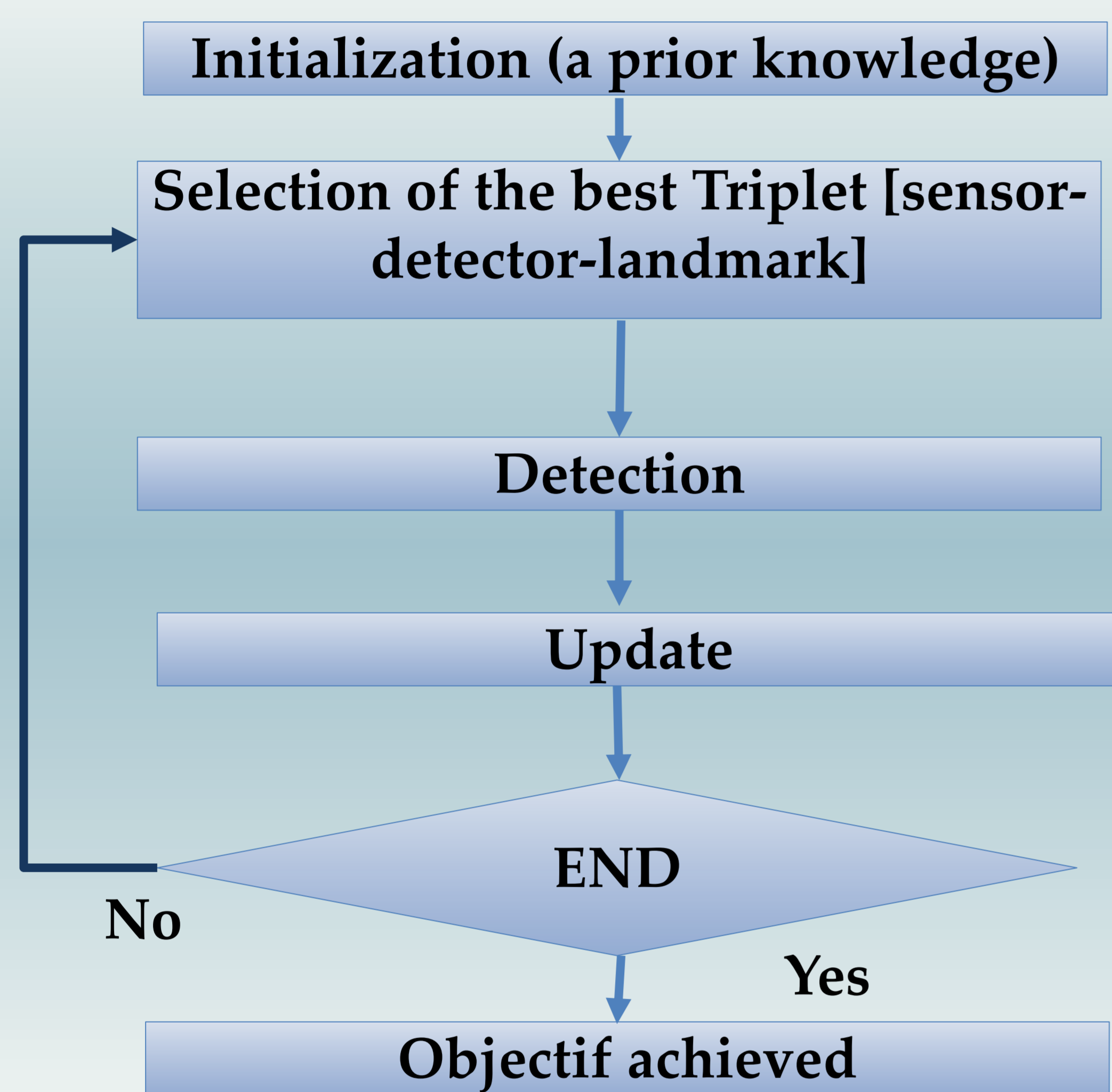
(2) Institut PASCAL, Campus Universitaire des Cézeaux, 4 Avenue Blaise Pascal, 63178 Aubière

Objectives

Road scene understanding has been the subject of different researches. Generally the elements of the road scene are recognized independently of each other. The main goal of this thesis is to develop a generic algorithm for road scene understanding, that takes into account the reliance between the road elements.



Global Scheme



Methods

- Using a prior knowledge about the road scene
- Selection of the Triplet [sensor-detector-landmark] in terms of an entropic criterion
- Taking into account the fact that detectors are not perfect
- The main goal is to have an estimation not only accurate but reliable too

Road scene modeling

- Each element of the road is described by a vector of N parameters \underline{X} , and an associated covariance matrix C_x
- Detect the element = estimate the N parameter of \underline{X}

Triplet sensor-detector-landmark

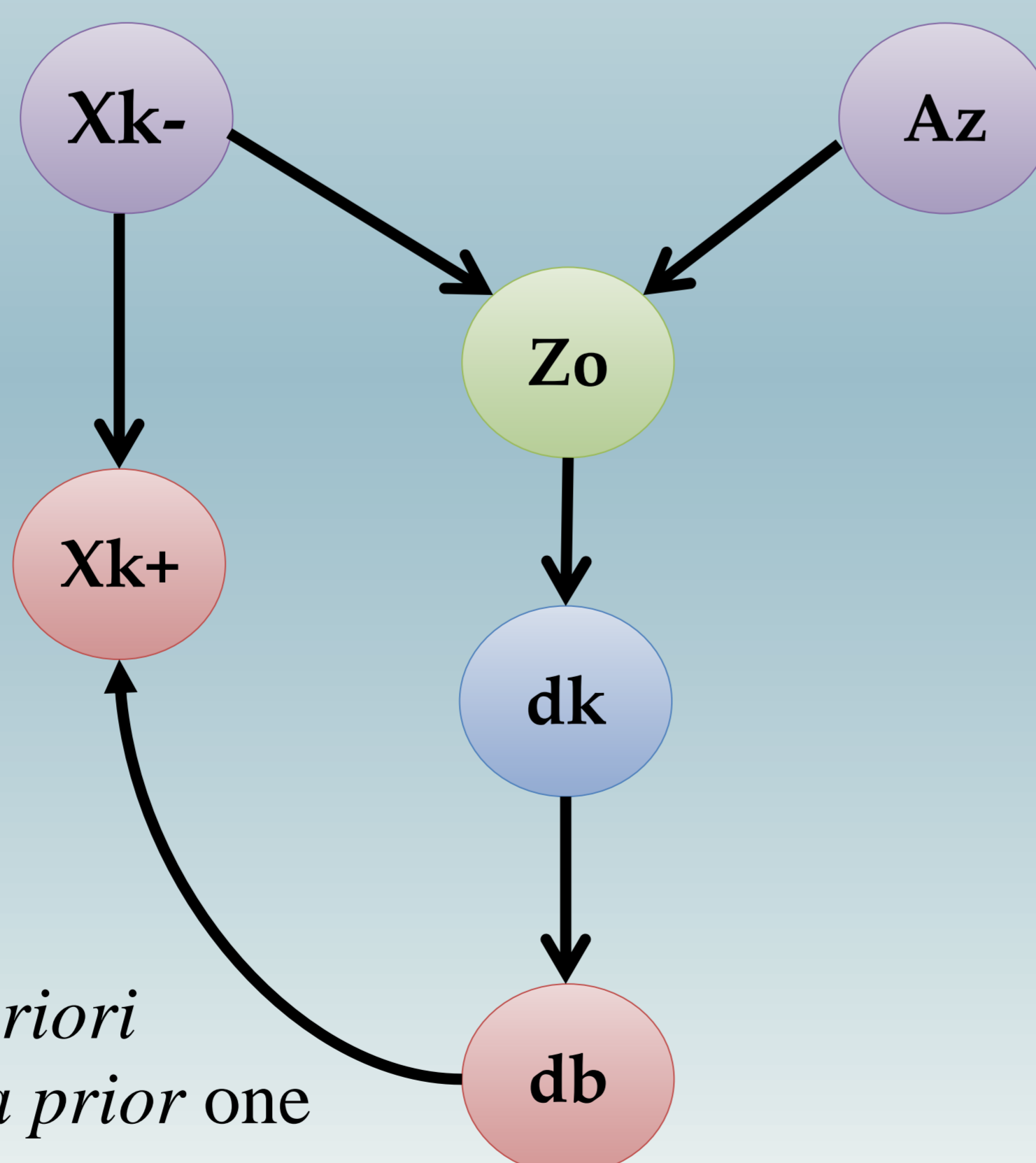
- Set consisting of a sensor, detector and landmark
- For ego lane detection, the ROI are described as triplet sensor-detector-landmark

Selection of the best triplet sensor-detector-Landmark

Bayesian Network

Before update: selection of the best triplet
After update: confidence update

- Confidence in the estimation before update
- Observability
- Occlusion
- Detector reliability
- Ambiguity
- Confidence in the estimation after update

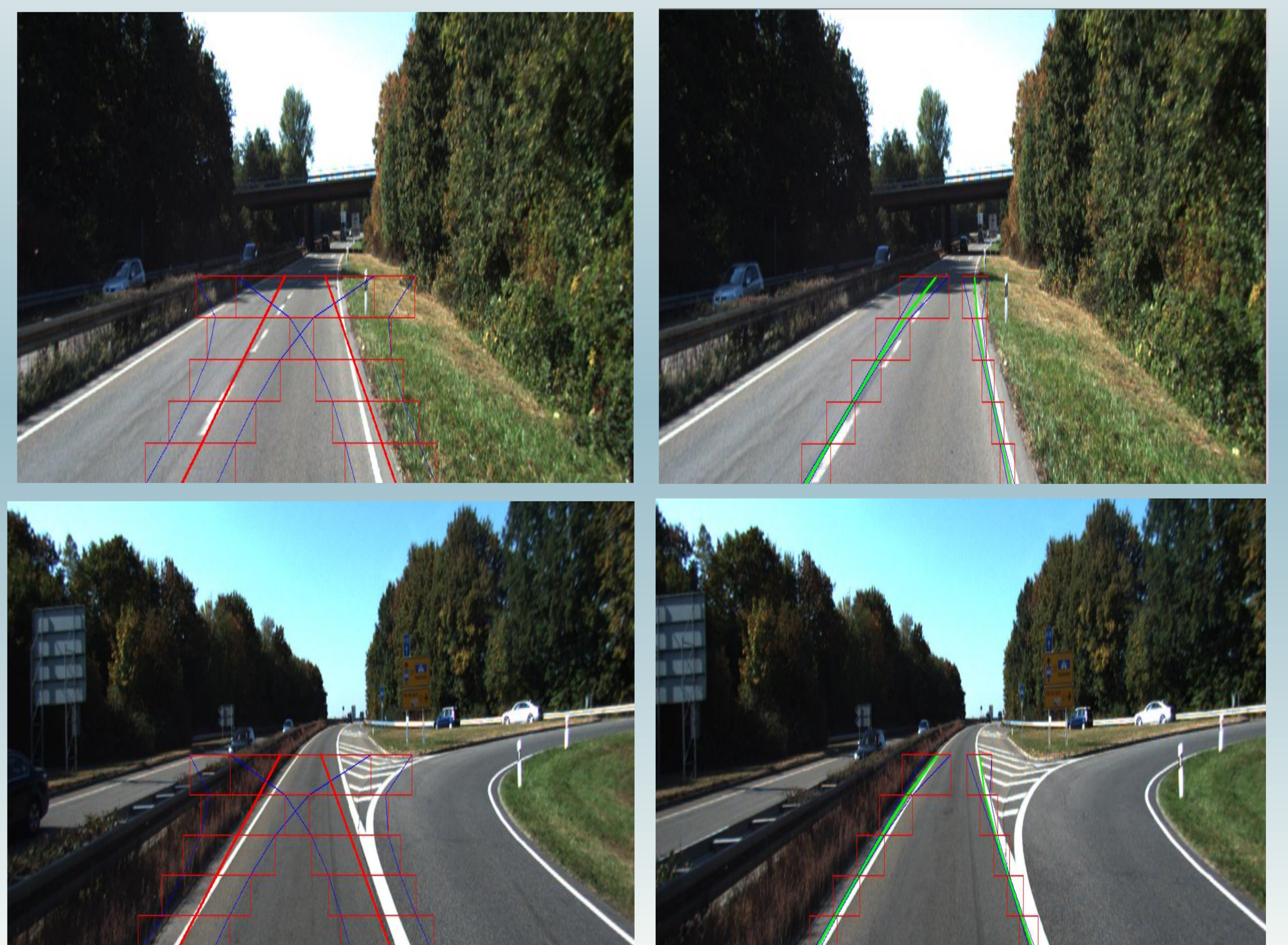


Entropic Criterion

- Difference between *posteriori* information content and *a priori* one

Some Results

Ego lane detection



Update

Extended Kalman Filter

- Update \underline{X} and C_x
- Update occurs only if the detection succeeded

Future Works

- Using data from multiple detectors
- Using a prior information from maps (OpenStreetMap)
- Testing our algorithm on a benchmark (KITTI)