A Road Edge Detection Approach

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interactIVe Final Event

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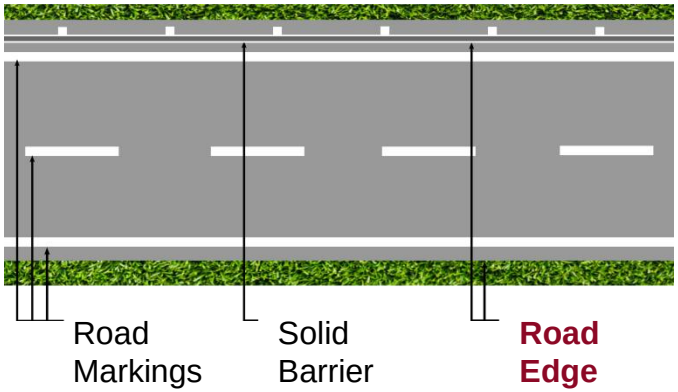
Introduction

More than 134.000 persons in EU - one third of all traffic accident fatalities - were killed in single vehicle accidents, within the decade 2000 - 2009

Source: Care Database / EC, date of query: January 2012



Road Edge Detection is crucial for ADAS:

- Free space modelling
- Dynamic environment representation
- Path planning in hazardous situations
- Avoidance of single vehicle crashes

Border of the driveable area:

- Homogeneous road ↔ off-road area (e.g. grass)
- Solid barrier (e.g. guardrail)

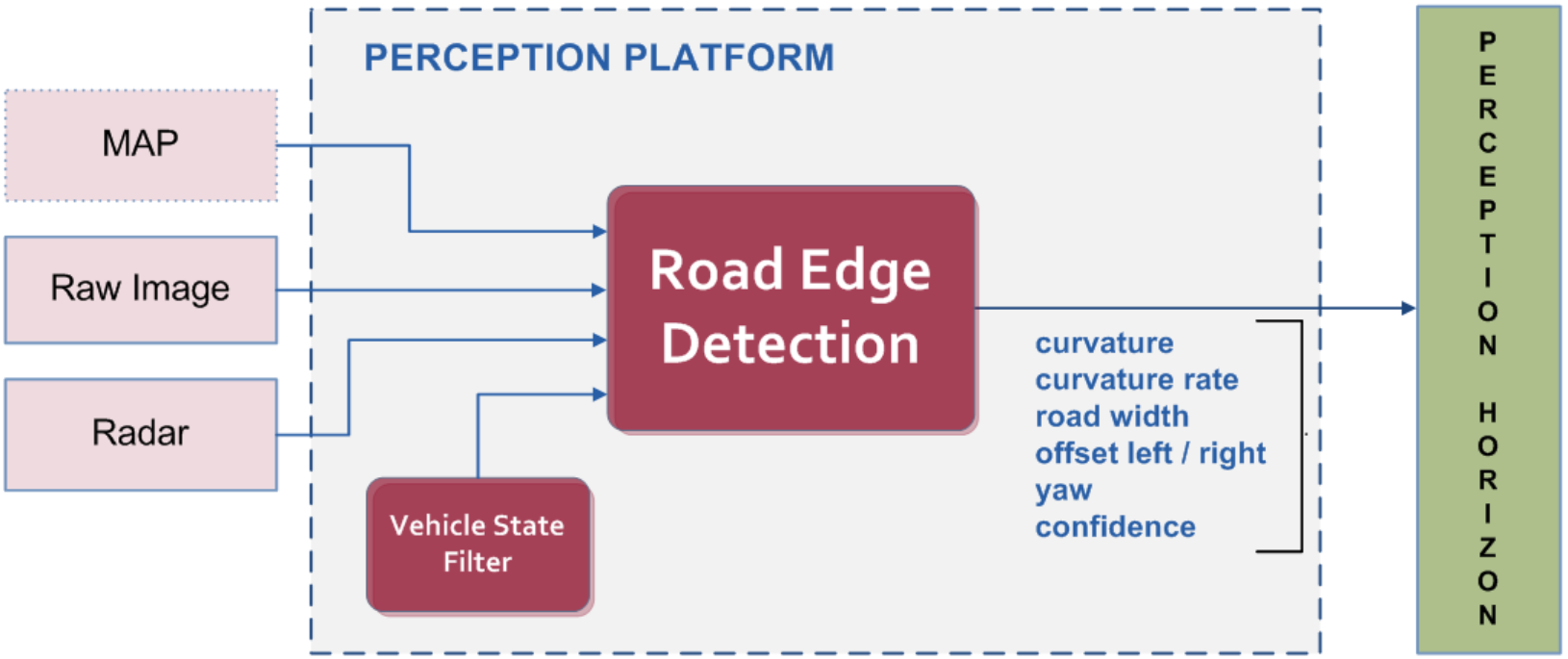
Challenges

Various
road types

Various
street surfaces

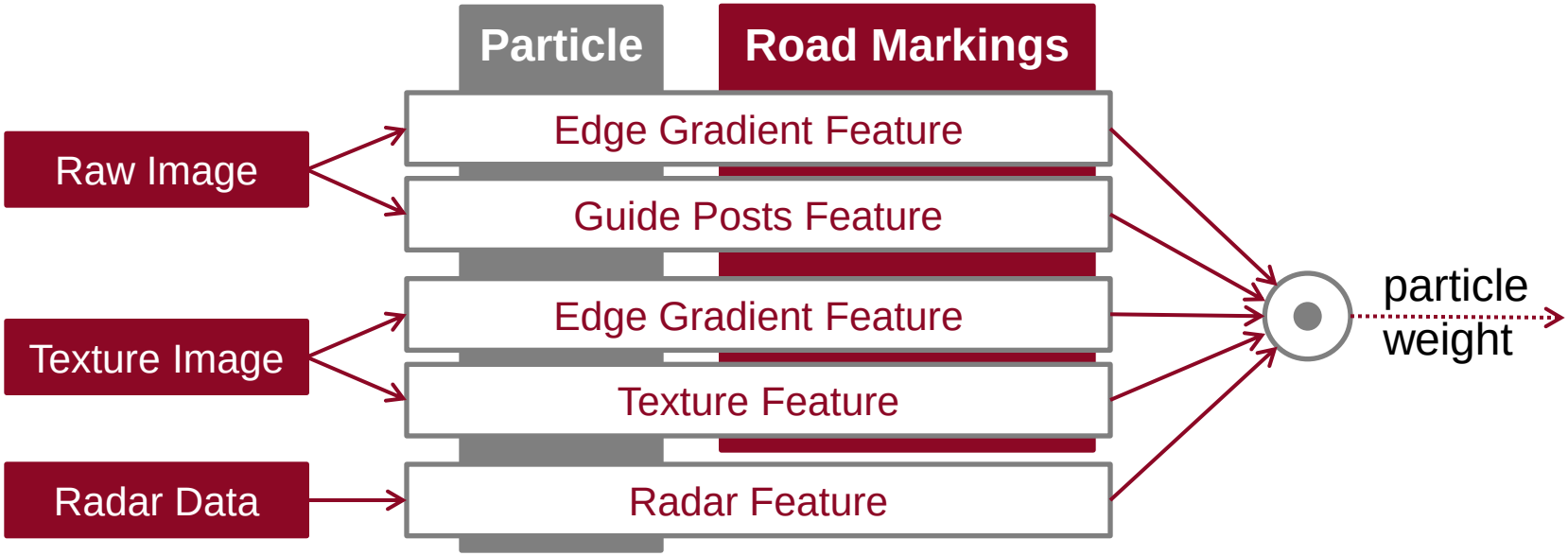
Various
border types

Architecture



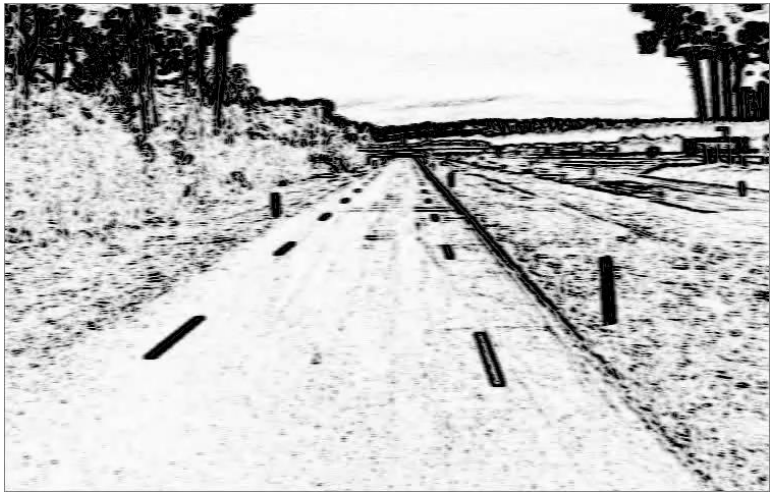
Algorithm Outline

- Left/right road edge is represented by a third order **polynomial**
- **Particle filtering** for prediction



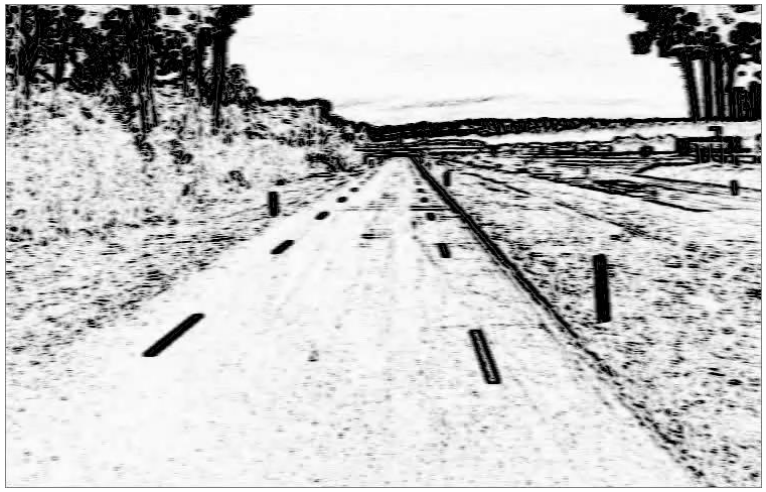
- Combine features that are fast to calculate (real-time)
- Easy integration of additional features and more sensors

Image Feature: Contours



Distance image based on strong image contours

Image Feature: Contours



Compensation of road markings

Image Feature: Texture

Variance of the texture is higher in non-road areas

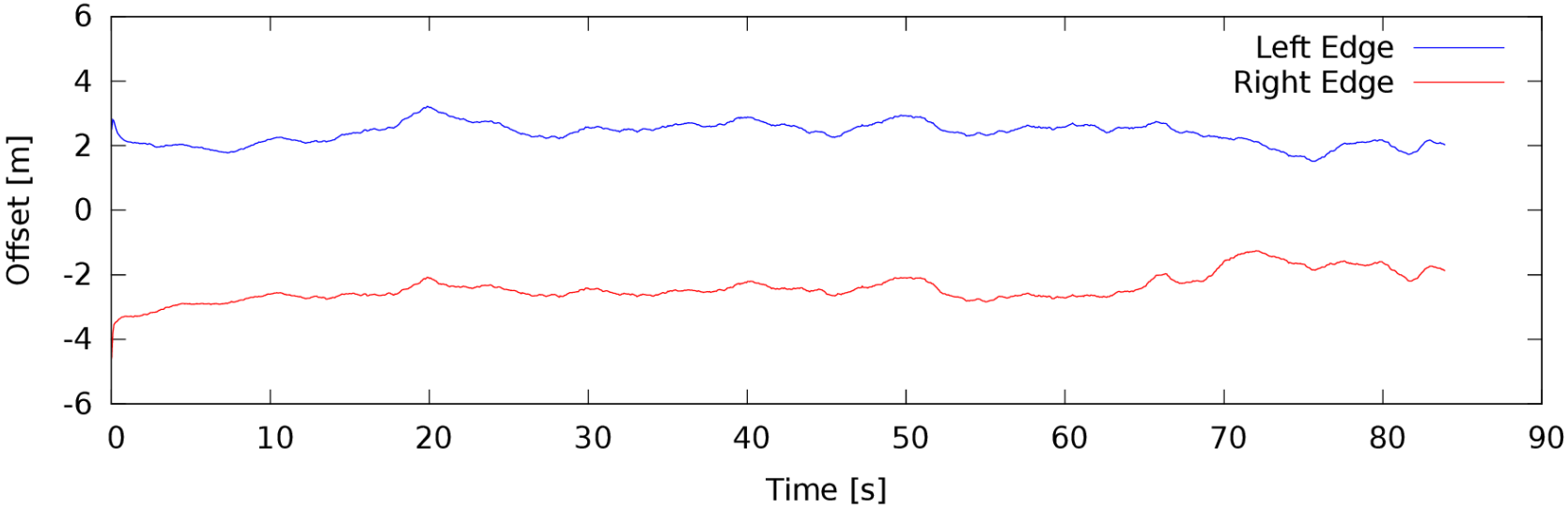
Feature: Guide Posts

Use guide posts for re-initialization

Demonstration

Evaluation

- Manual labeling of reference data
- Reference points up to 20m in front of the vehicle



- Road Edge Detection Error: $\mu = 10[cm],\ \sigma = 15[cm]$

Conclusions and Future Work

Conclusions:

- **Early fusion**
- **Real-time** capable
- **Online testing** in different vehicles: Volvo Truck, Ford and Fiat
- Focus on **country roads** and **highways**
- Part of the *interactIVe* **perception platform**

Future Work:

- Separate hypotheses for left and right boundary
- Improved confidence estimation

Acknowledgements

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SEVENTH FRAMEWORK
PROGRAMME

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