Automated and Connected Driving Challenges
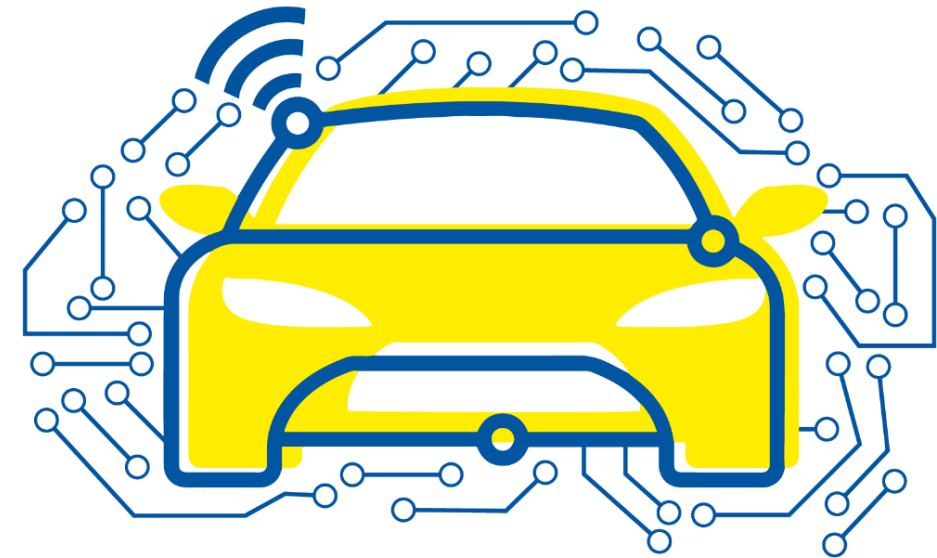
Section 3 – Object Fusion and Tracking

Introduction

Tasks in Section 3

Bastian Lampe

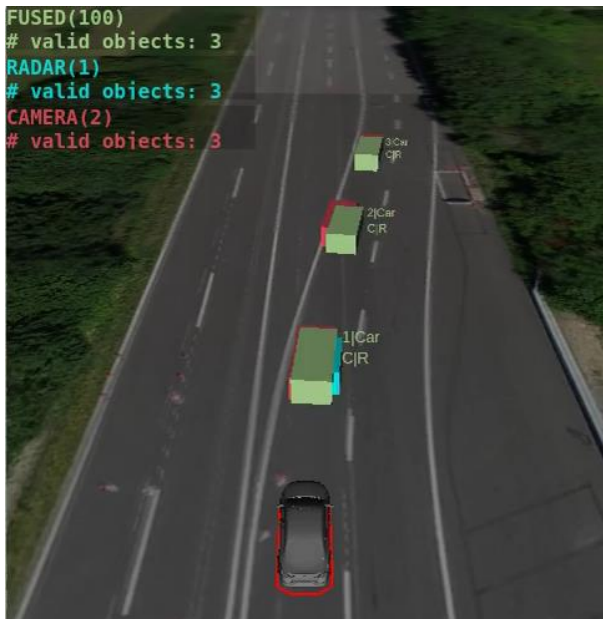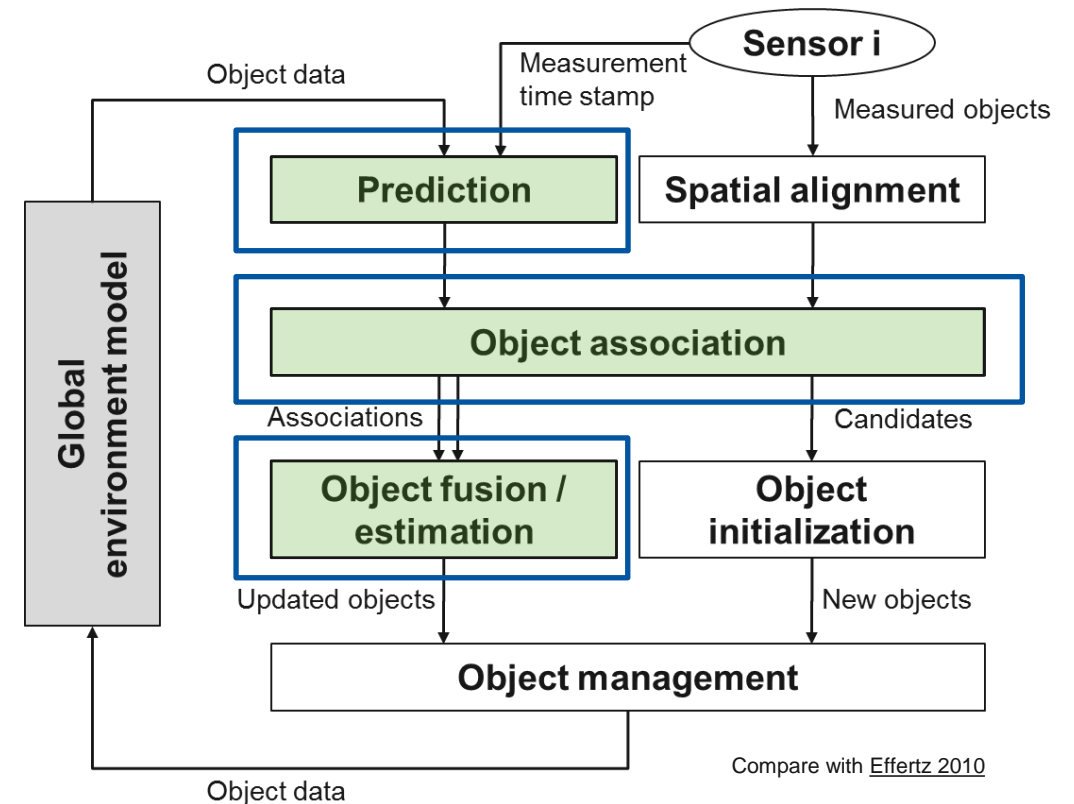Institute for Automotive Engineering

Task Overview

- **Examination** of three steps of the **Kalman filter**
- **Implementation** of modules highlighted in green
- **Using** a Closed-Loop-Simulation using **ROS**

Multi-Instance Kalman Filter

Compare with Effertz 2010

Introduction – Tasks in Section 3

Object Prediction

Subdivided into three Subsections

- **Examination** of three steps of the **Kalman filter**
- **Implementation** of modules highlighted in green
- **Using** a Closed-Loop-Simulation using **ROS**

Object Prediction

- **Understand** mathematical background of temporal alignment
- **Construct** a vehicle motion model
- **Perform** a Kalman Filter prediction step

Multi-Instance Kalman Filter

Compare with Effertz 2010

Introduction – Tasks in Section 3
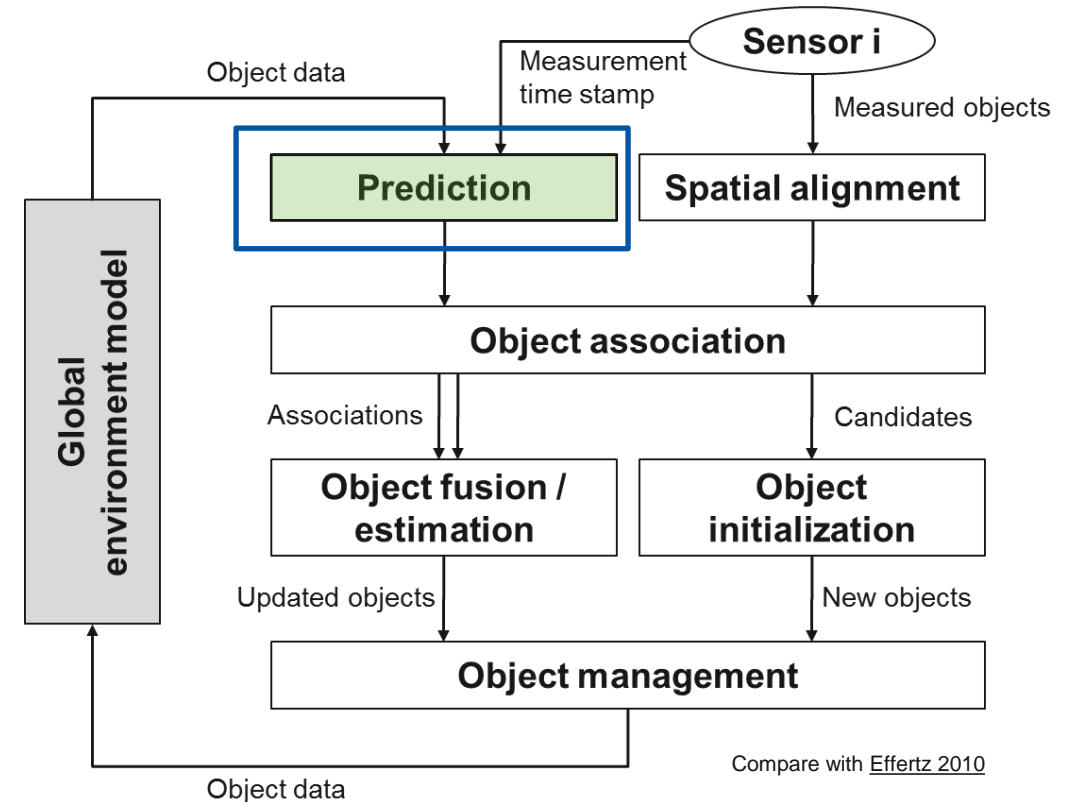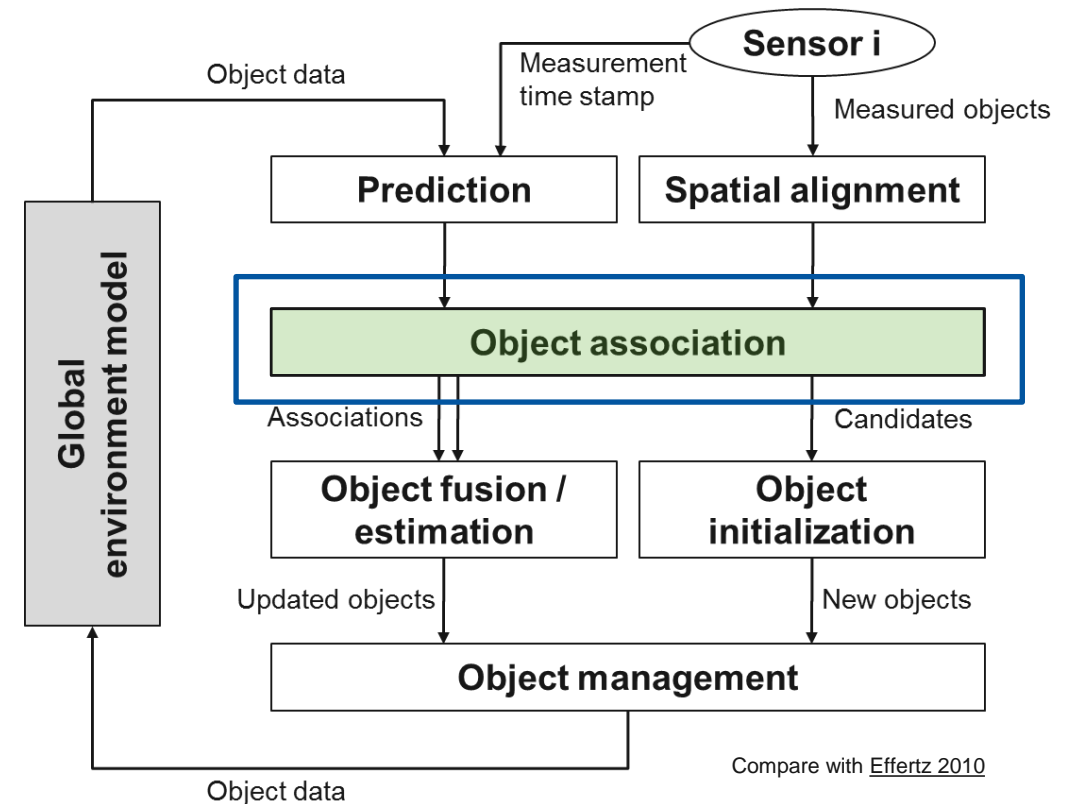
Object Association

Subdivided into three Subsections

- **Examination** of three steps of the **Kalman filter**
- **Implementation** of modules highlighted in green
- **Using** a Closed-Loop-Simulation using **ROS**

Object Association

- **Learn** about metrics used for cost functions
- **Implement** calculation of Intersection of Union (IoU) and Mahalanobis distance
- **Apply** an association algorithm

Multi-Instance Kalman Filter

Compare with Effertz 2010

Introduction – Tasks in Section 3

Object Fusion

Subdivided into three Subsections

- **Examination** of three steps of the **Kalman filter**
- **Implementation** of modules highlighted in green
- **Using** a Closed-Loop-Simulation using **ROS**

Object Fusion

- **Examine** the measurement update step of a Kalman filter
- **Perform** an object fusion
- **Experiment** with fusion parameters

Multi-Instance Kalman Filter

Compare with Effertz 2010