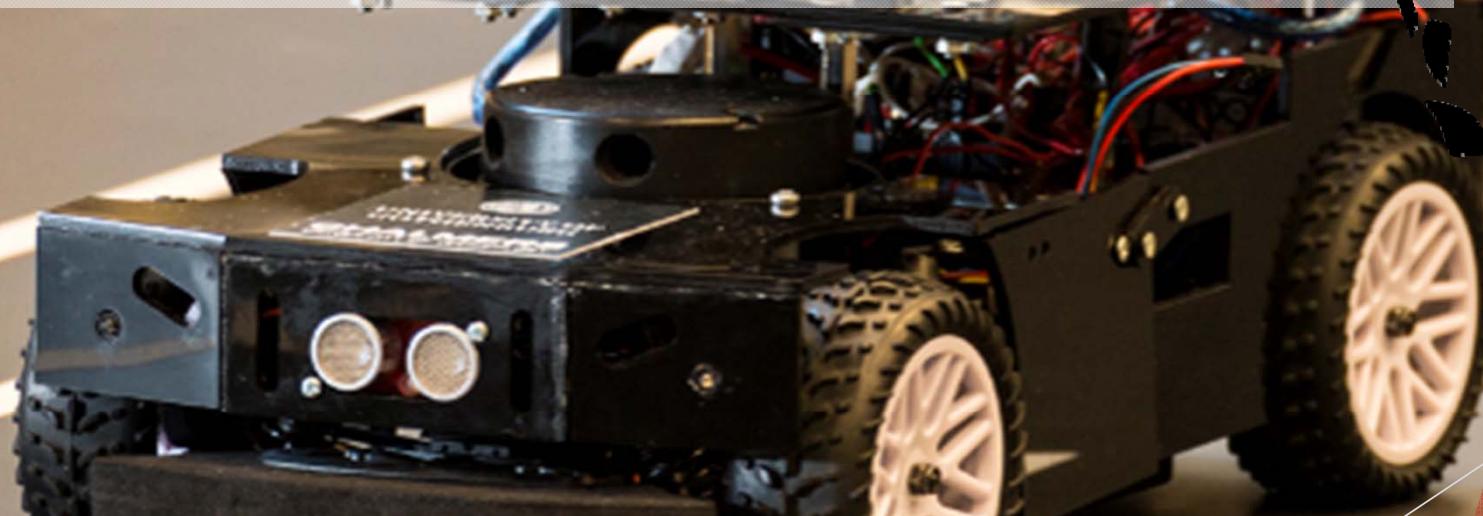


Team M.O.O.S.E.

Carolo-Cup 2015



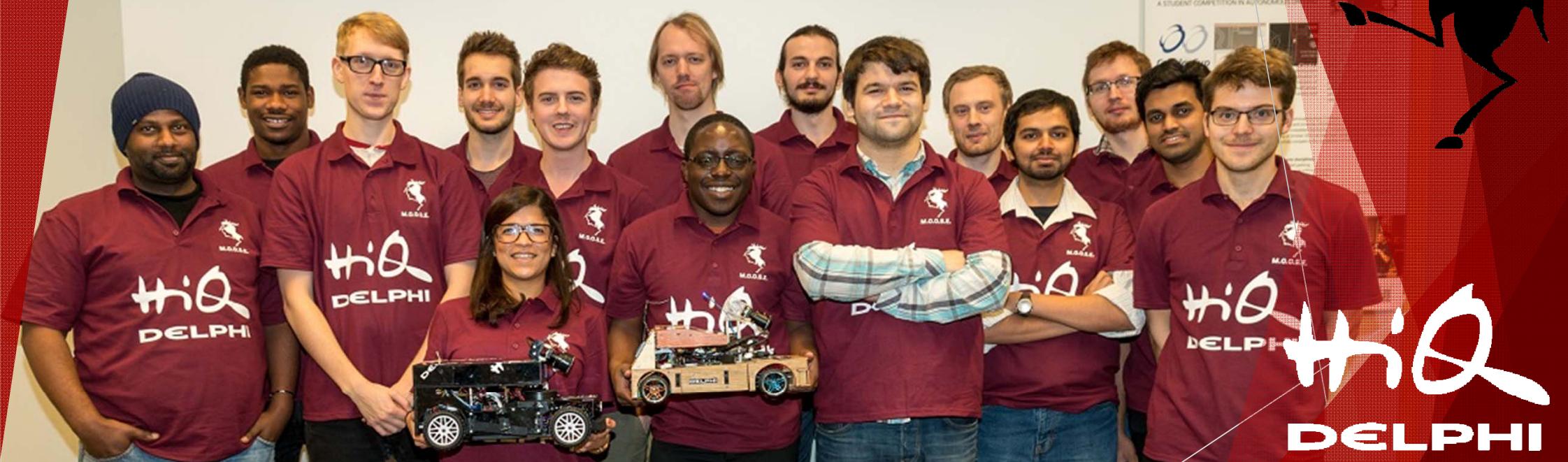
February 10, 2015

CHALMERS



UNIVERSITY OF GOTHENBURG

THIS IS M.O.O.S.E...

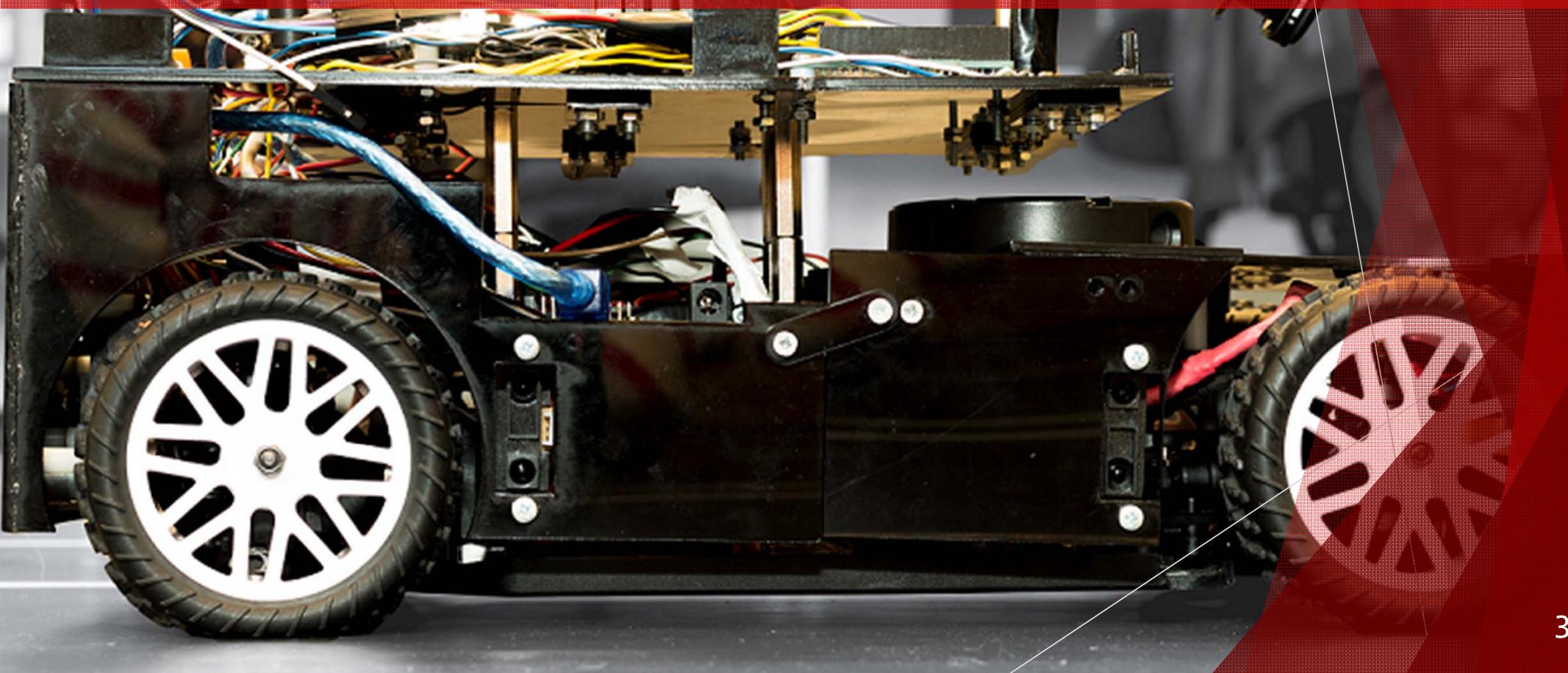


CHALMERS



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OVERALL CONCEPT



Our Rides

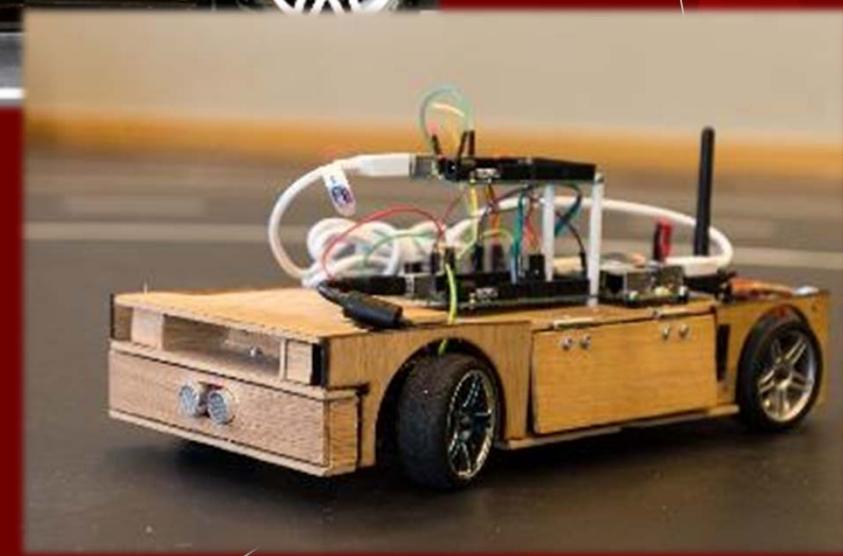
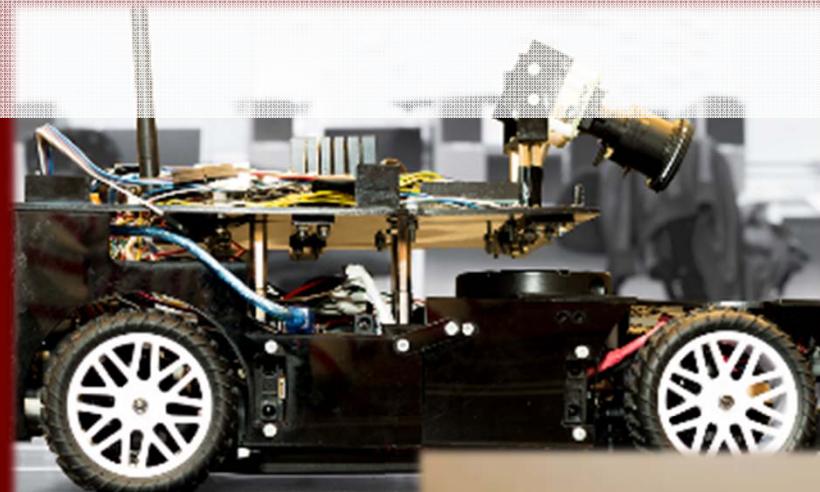
OVERALL CONCEPT

Evaluation

"Version 2.0"

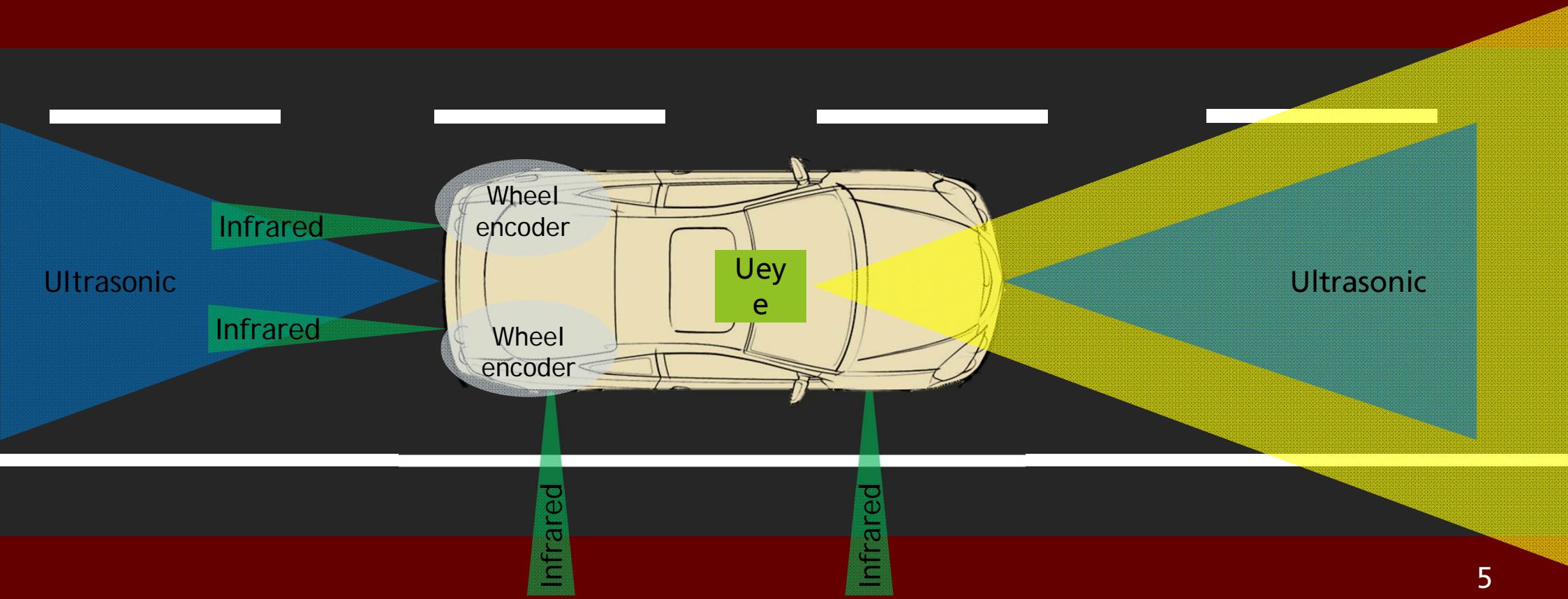
Develop different scenarios
in parallel

Code generalization



OVERALL CONCEPT

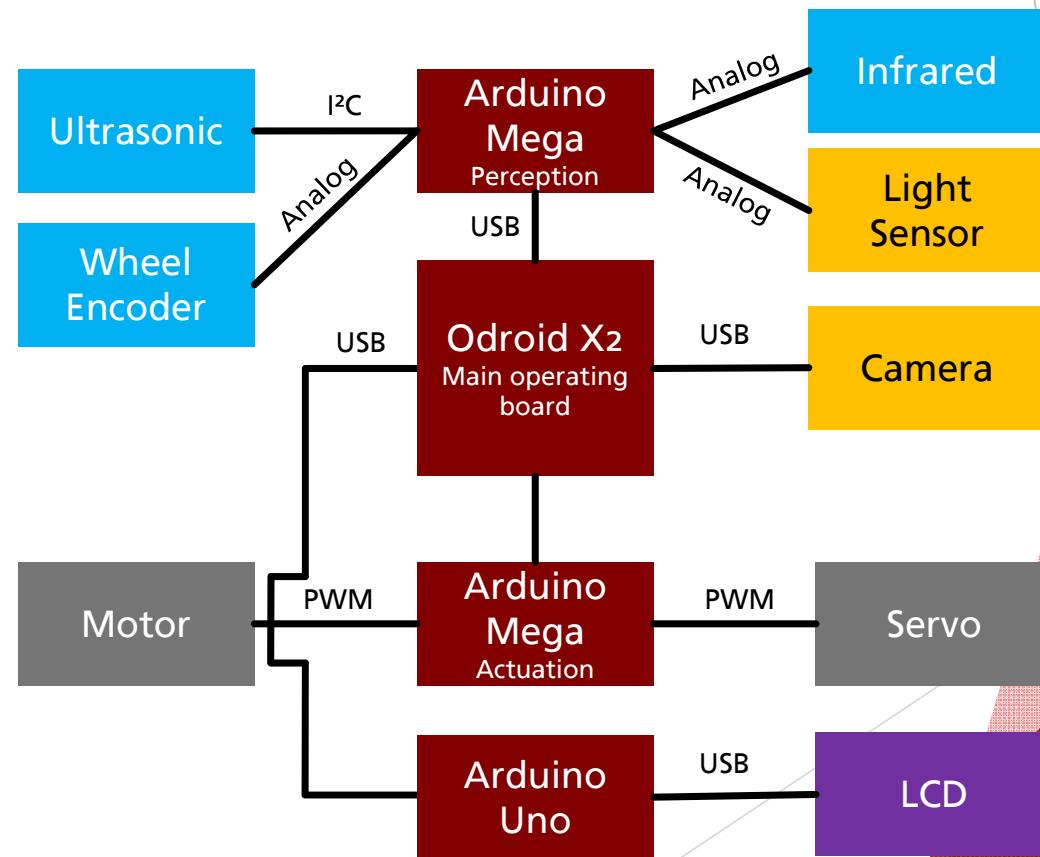
Sensor Layout



Hardware Architecture

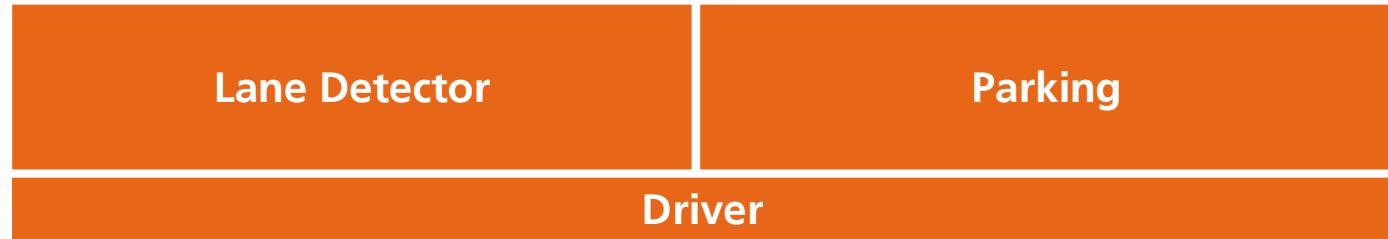
Task separation

Light sensor
complements camera



Software Architecture

Platform
Independent



Platform
Abstraction



Platform
Specific



LANE FOLLOWING



LANE FOLLOWING

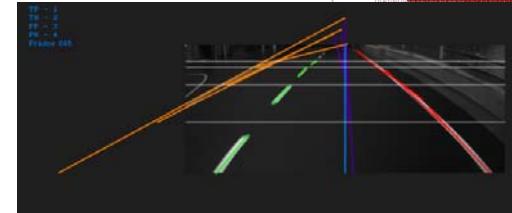
Image Processing

Component

Task

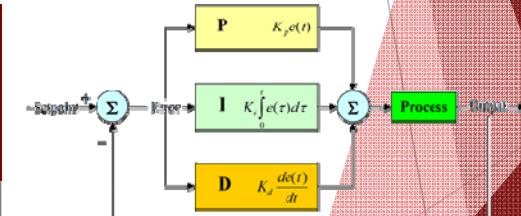
Lane
Detector

- Detect lines (Dashed & Solid)
- Find vanishing point
- Calculate two goal lines



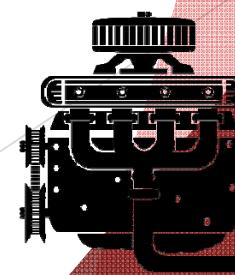
Driver

- PID controller
- Send decision

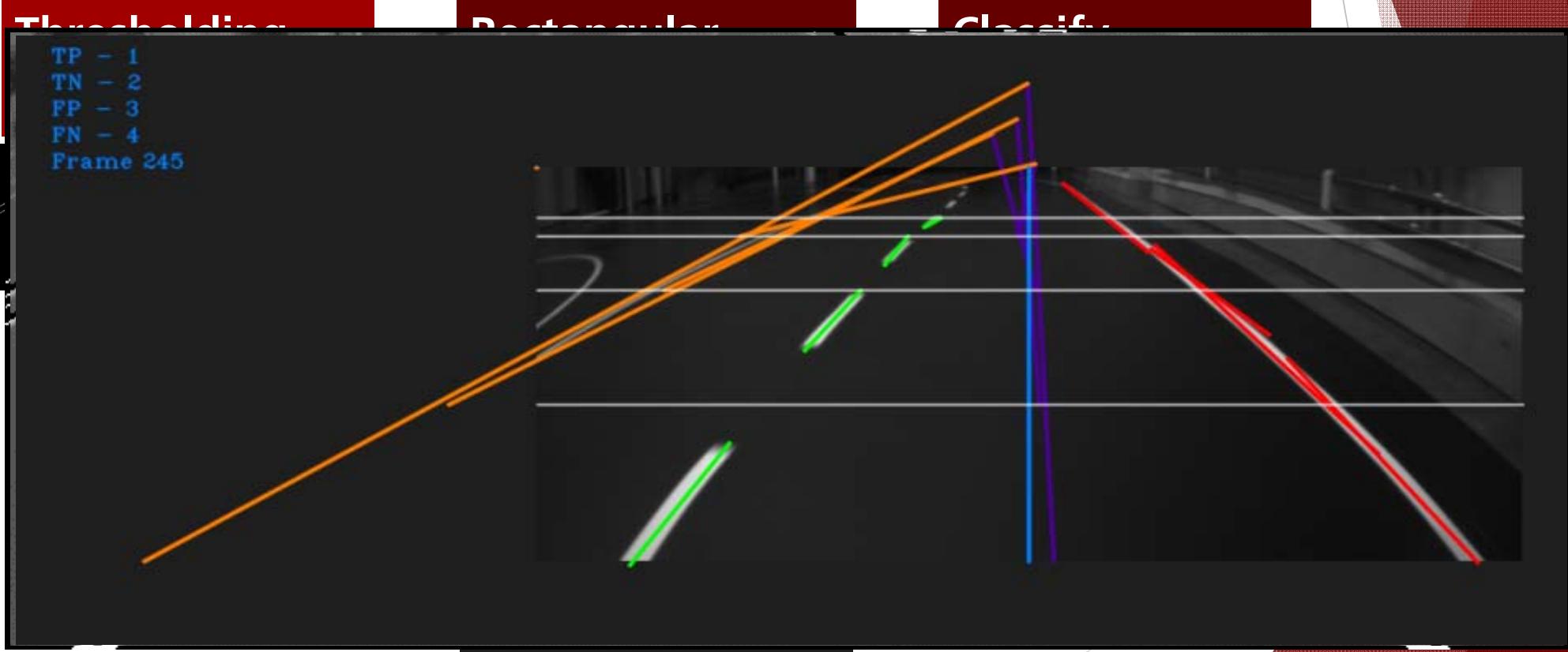


Motor
Controller

- Execute commands to motor
- Execute commands to the led indicators



Lane Detection

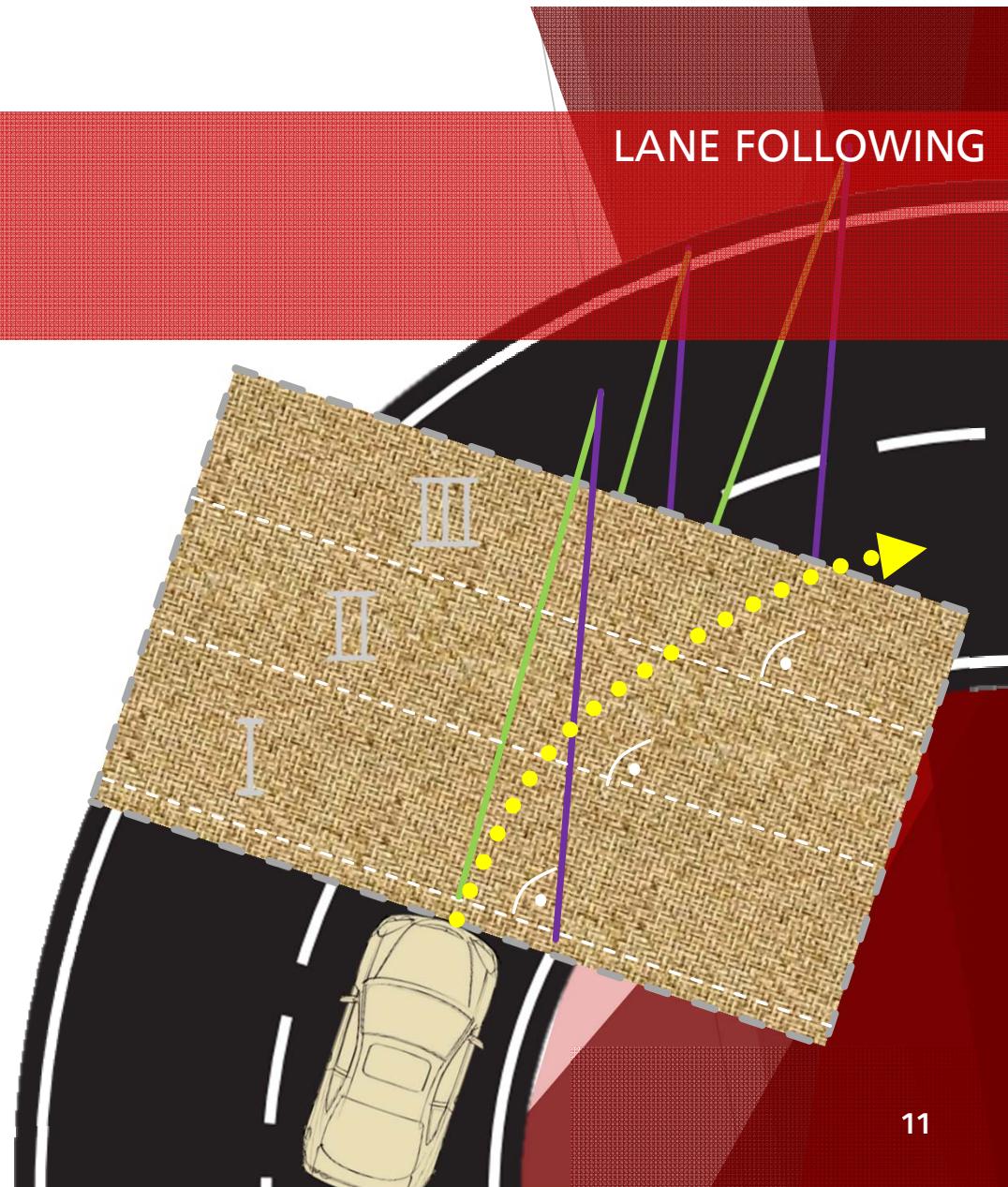


Curve & PID

Split up frame

PID assumes future position

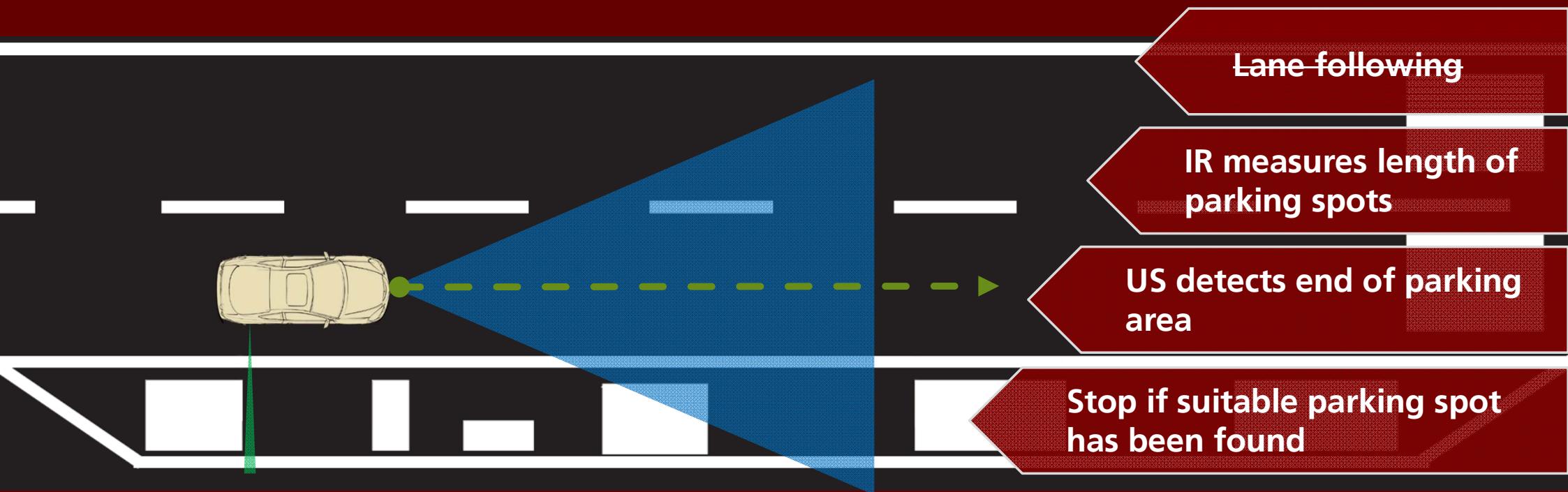
PID tuning



PARKING



Concept – Part 1



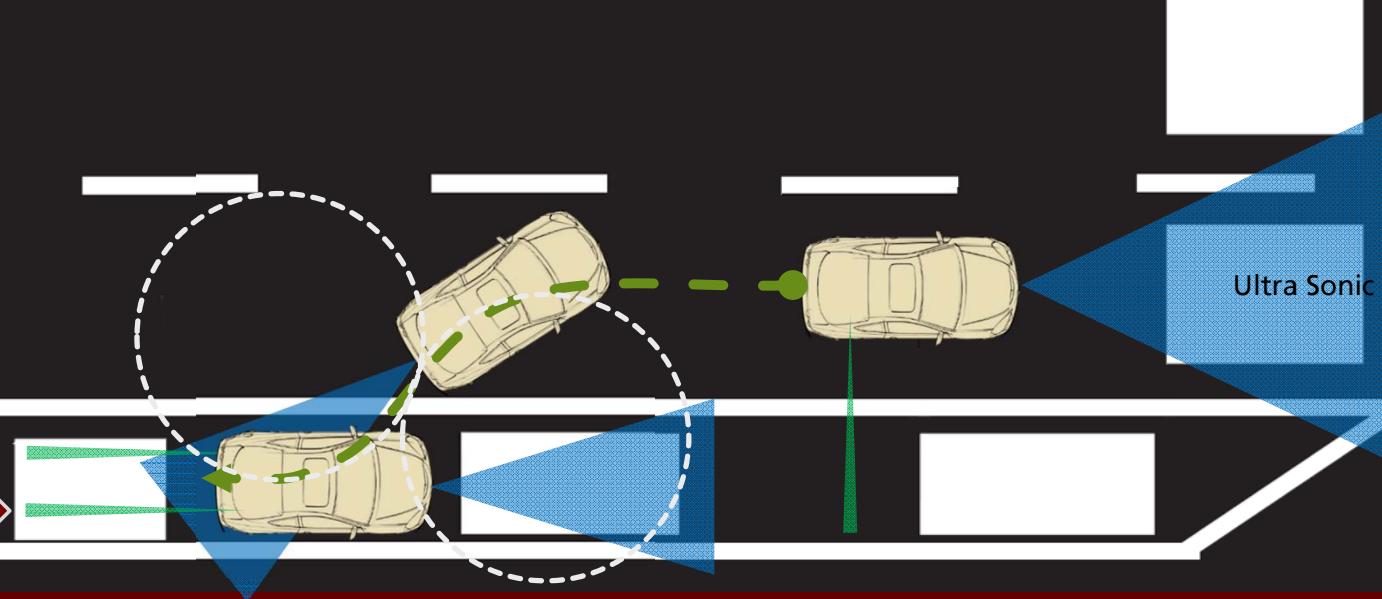
Concept – Part 2

Dynamic trajectory

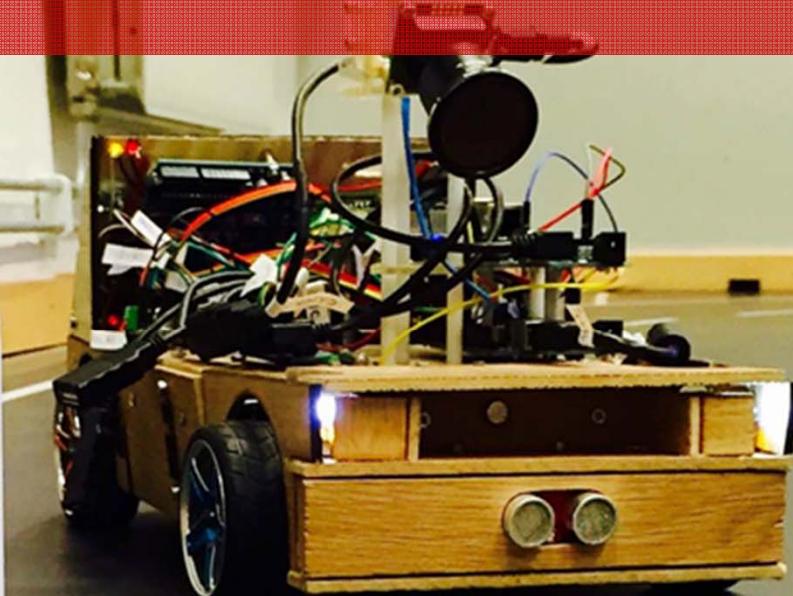
Wheel encoder

Two circles

IR & US bump in protection



OBSTACLE AVOIDANCE



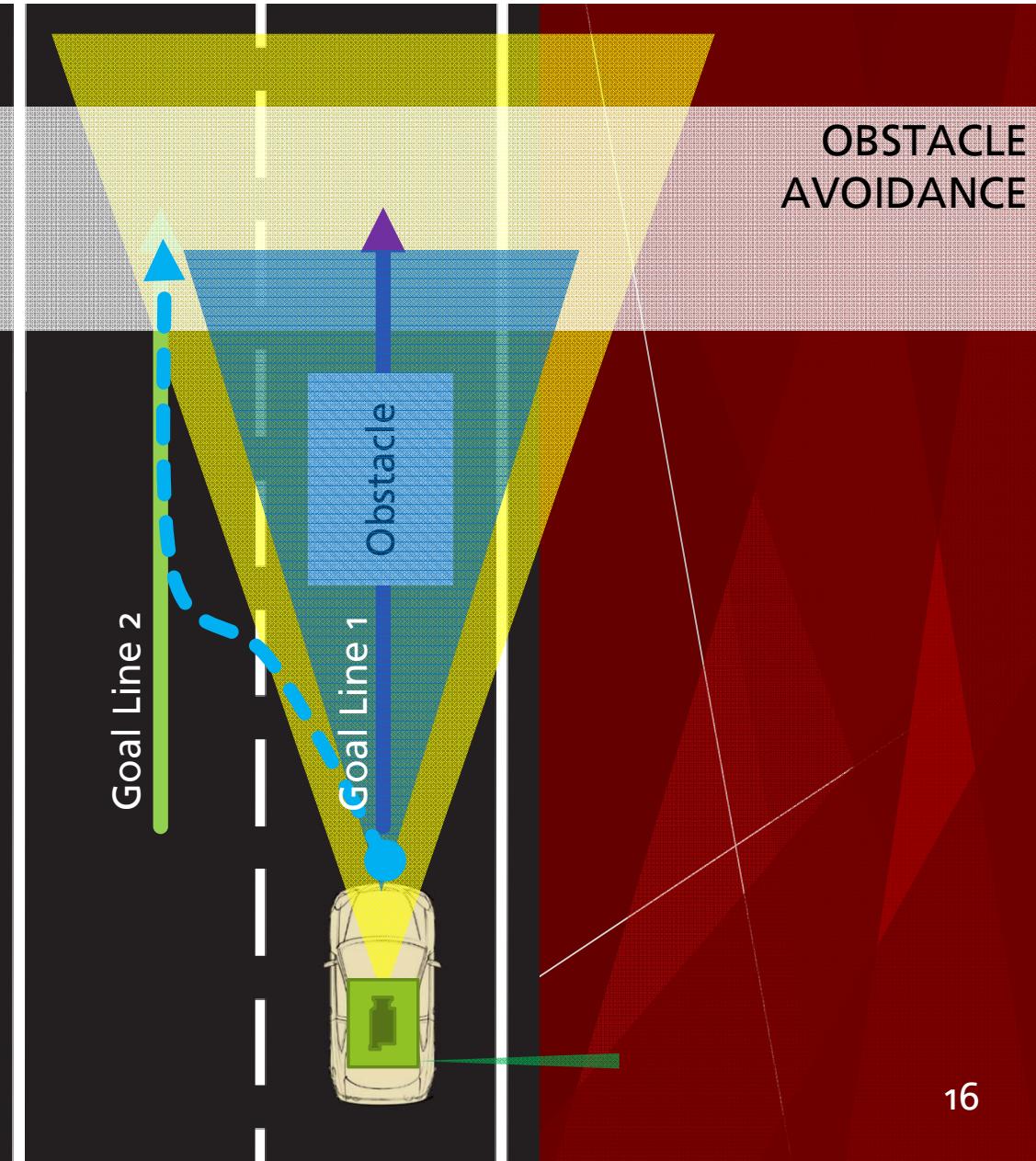
Overtaking

Camera detects obstacle

US measures distance

Second Goal Line

IR indicates take over



Intersection Handling

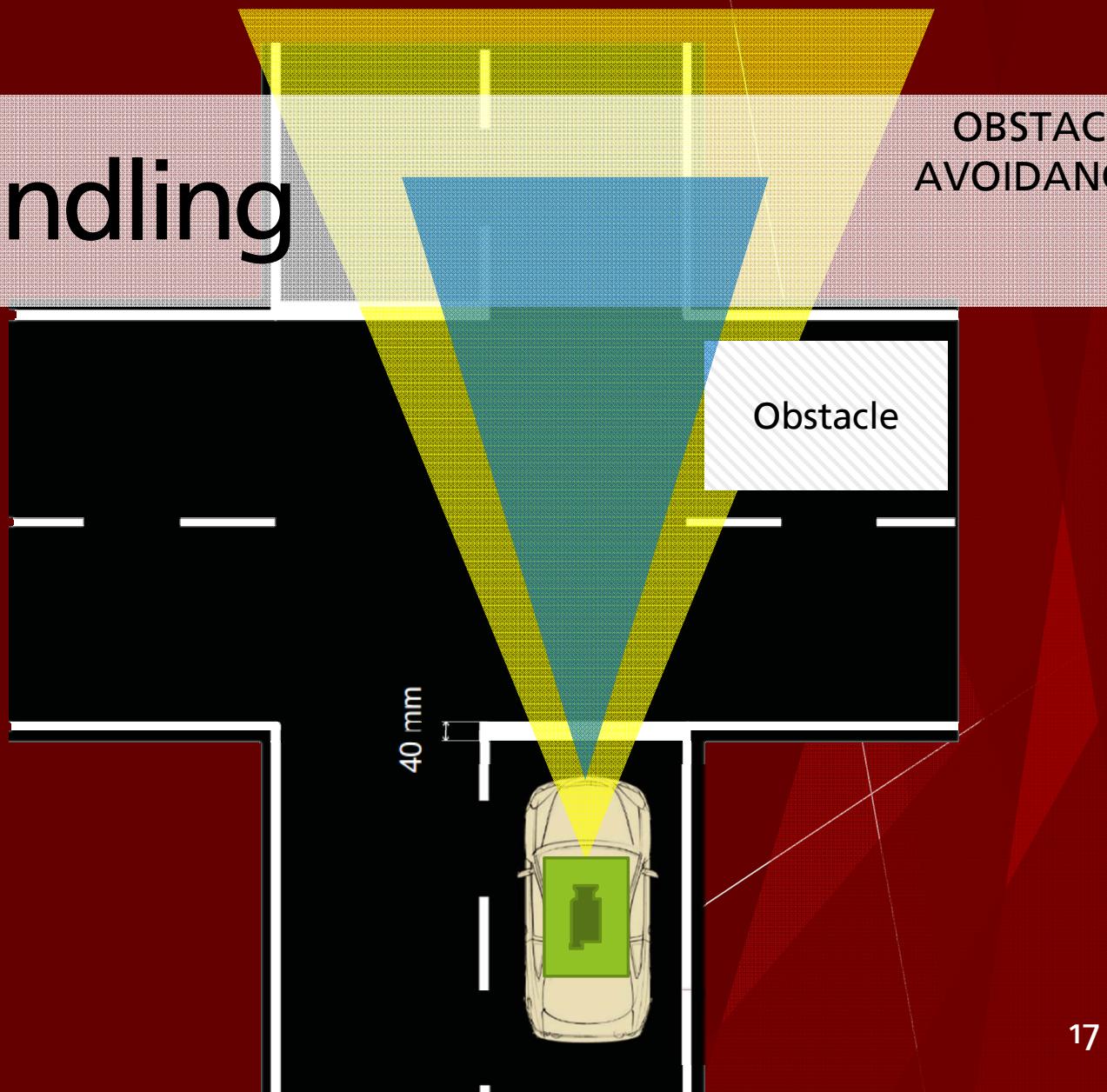
OBSTACLE
AVOIDANCE

Camera detects stop
line

Camera obstacle

US plausibility

US distance



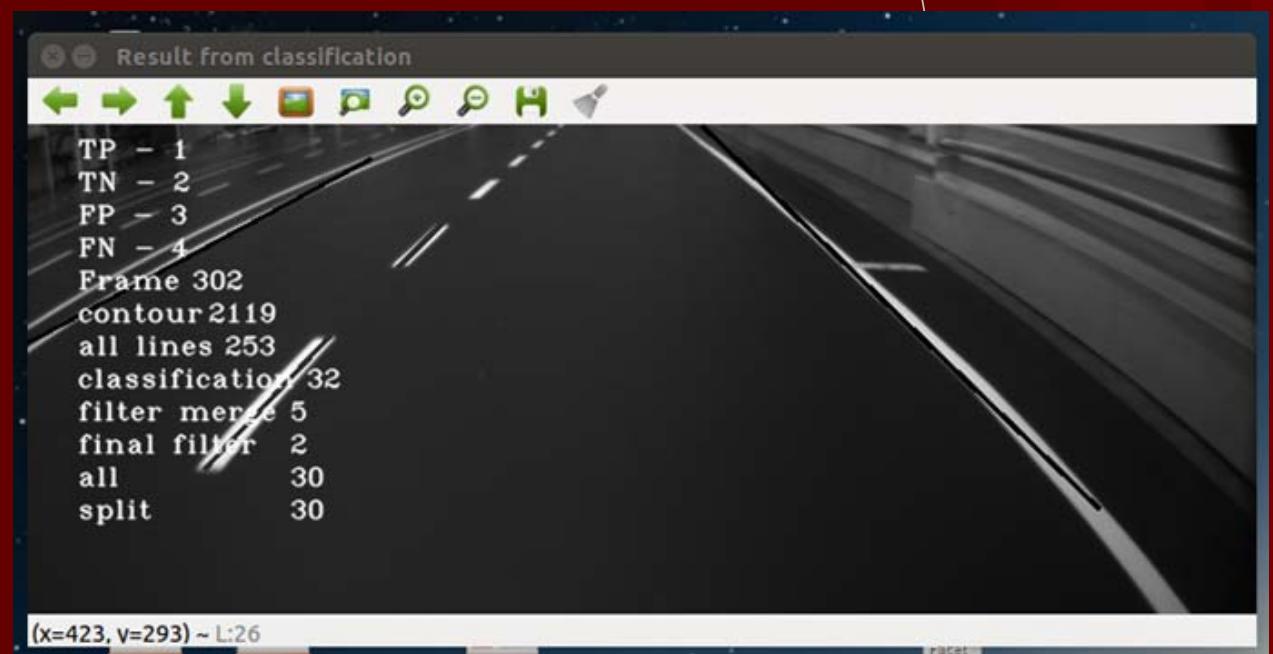
Test & Verification

Test catalogue

Binary classification

Automated testing

500m / 1.5km

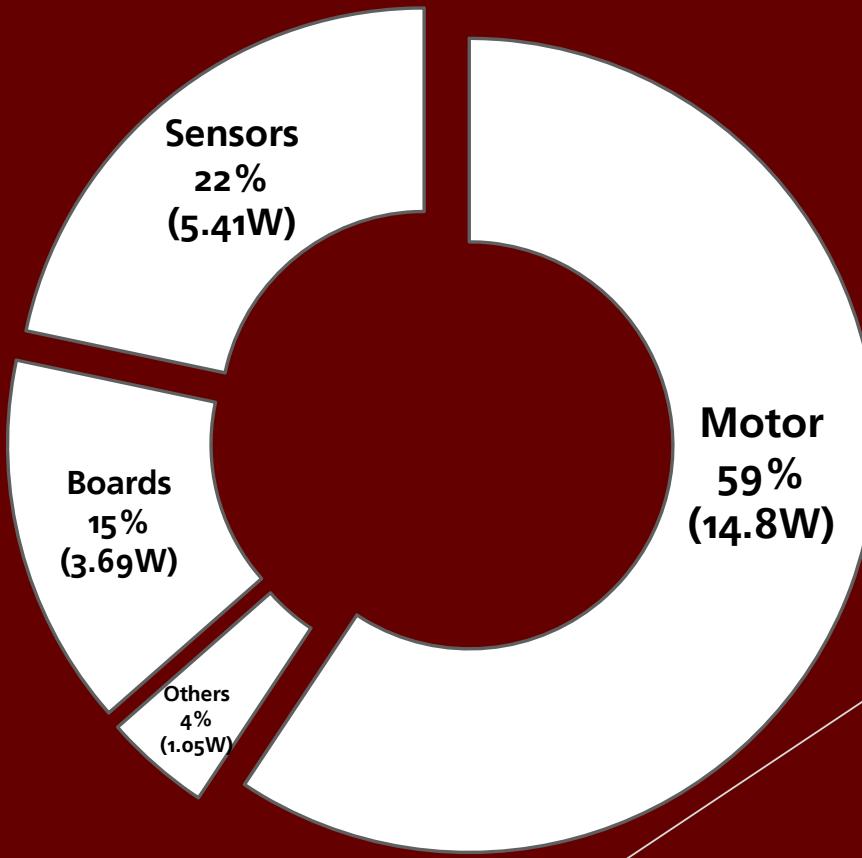


Energy Consumption

Total consumption:
24.95 Watts

Battery capacity:
5500 mAh

Running time:
~1h 15min

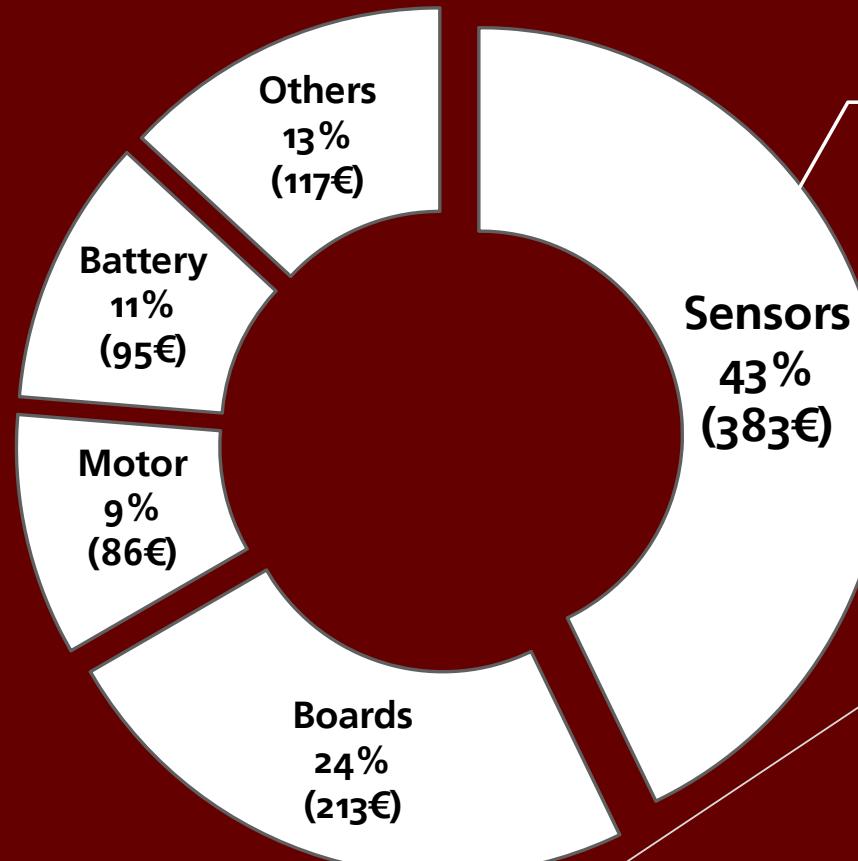


Costs

Total costs:
894€

Other teams 2014

CDLC:	3665 €
Berlin United:	2605 €
Spatzenhirn:	1800 €
S.A.D.I.:	1435 €
TUM 2014:	1340€
Ostfalia-Cup:	1300 €



Ueye: 295€
 Filter: 44 €
 Light sensor: 6 €
 US/IR: 12 €
 Wheel Encoder: 26 €

Special thanks to:



DELPHI



CHALMERS
UNIVERSITY OF TECHNOLOGY



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GOTHENBURG