Robotics and
Embedded Systems

Seminar

Context Prediction in Autonomous Driving

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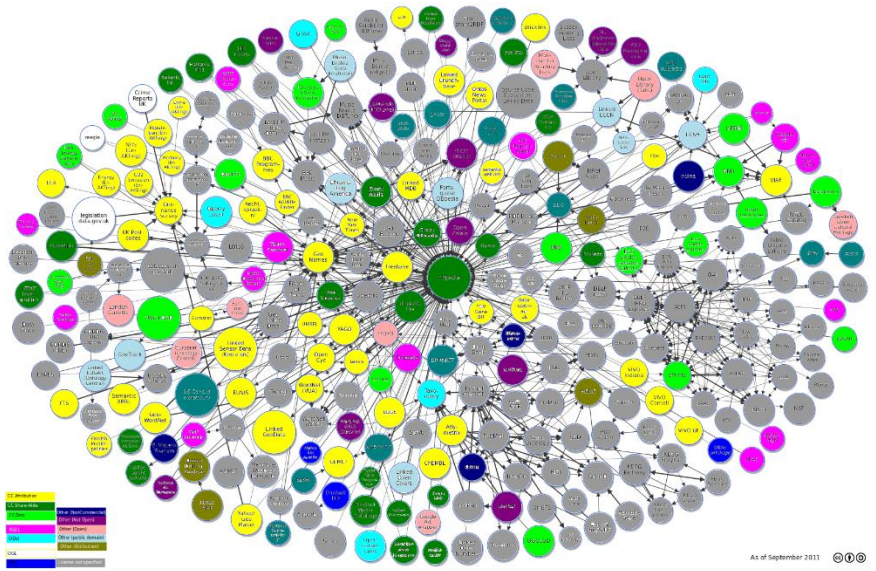
WS 2017-2018

First of All

What is Context?

Context – The Meaning of Data

➢ By Changing the Perspective on Data and the Way We Interpret the Numbers, We Define Context on Data

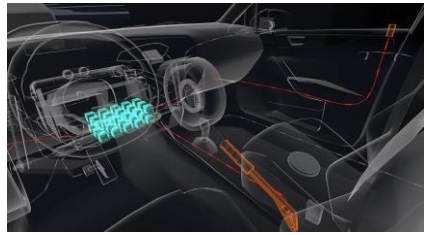


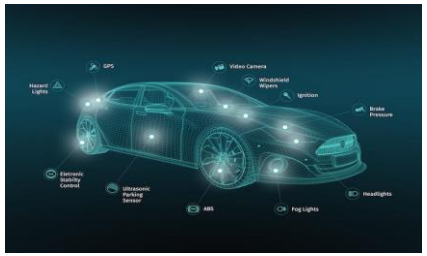
“Any Information That Can Be Used to Characterize the situation of an Entity Is Called Context”

Common Ground of the Projects

➢ **State-of-the-Art in Autonomous Driving:**

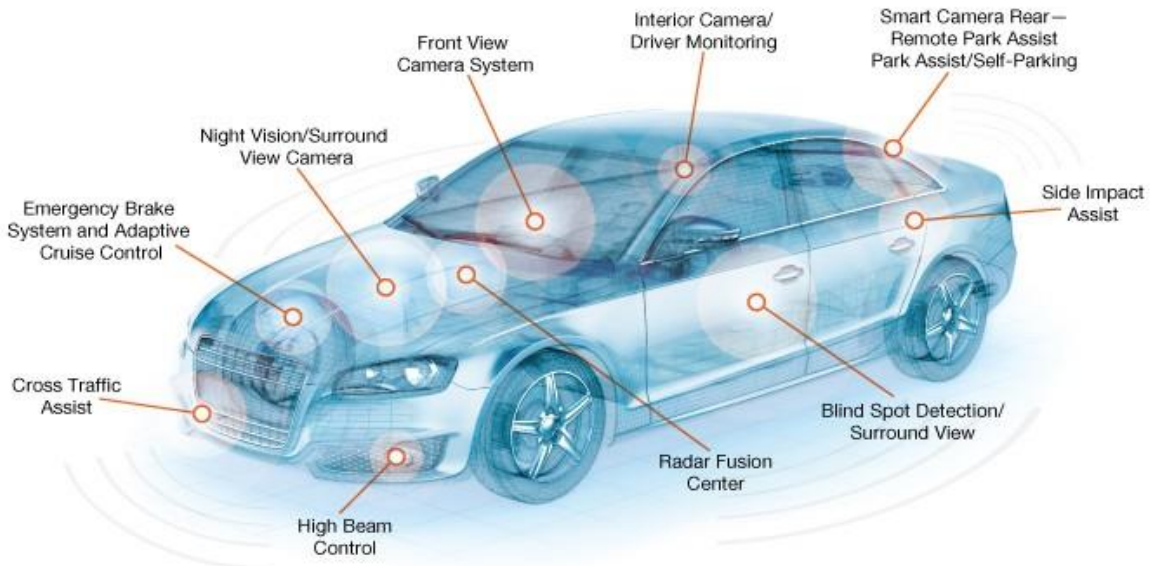
- ✓ Trajectory Analysis in Autonomous Driving
- ✓ Identification of Driver Behavior Characteristics
- ✓ Real-Time Prediction Approaches
- ✓ Image Processing by Deep Learning (In-Car Cameras)
- ✓ Personalized Situation-Adaptive User Interaction in the Car
- ✓ Improving the Data Collection Process
- ✓ Voice Dialogue Systems for Hands-Free Interaction
- ✓ etc.

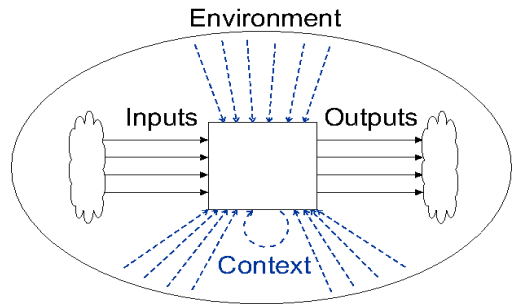




Advanced Driver Assistance System Applications

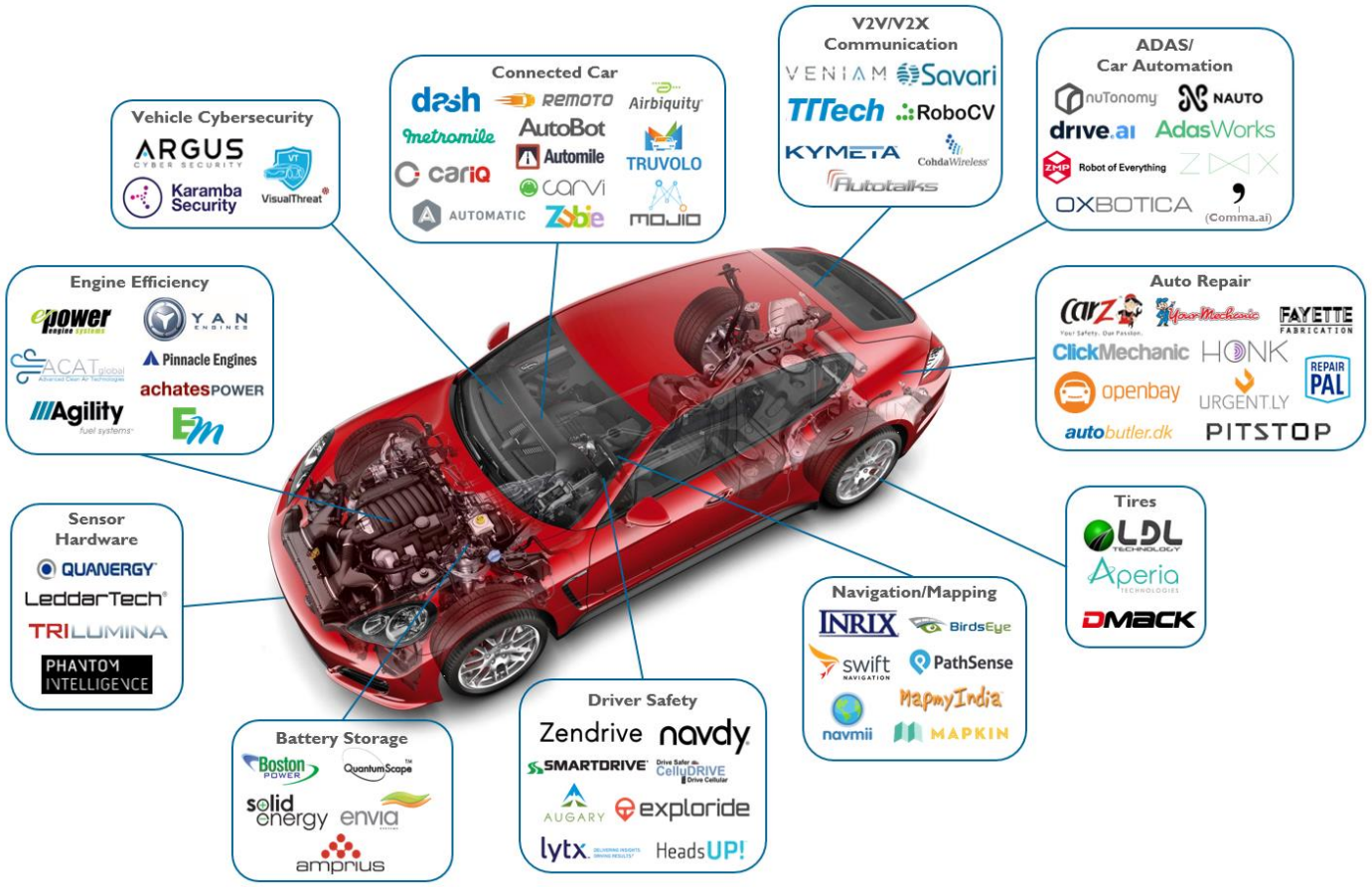
- Each Intelligent Component Needs:
  - ✓ **Right Data**
  - ✓ **Right Time**





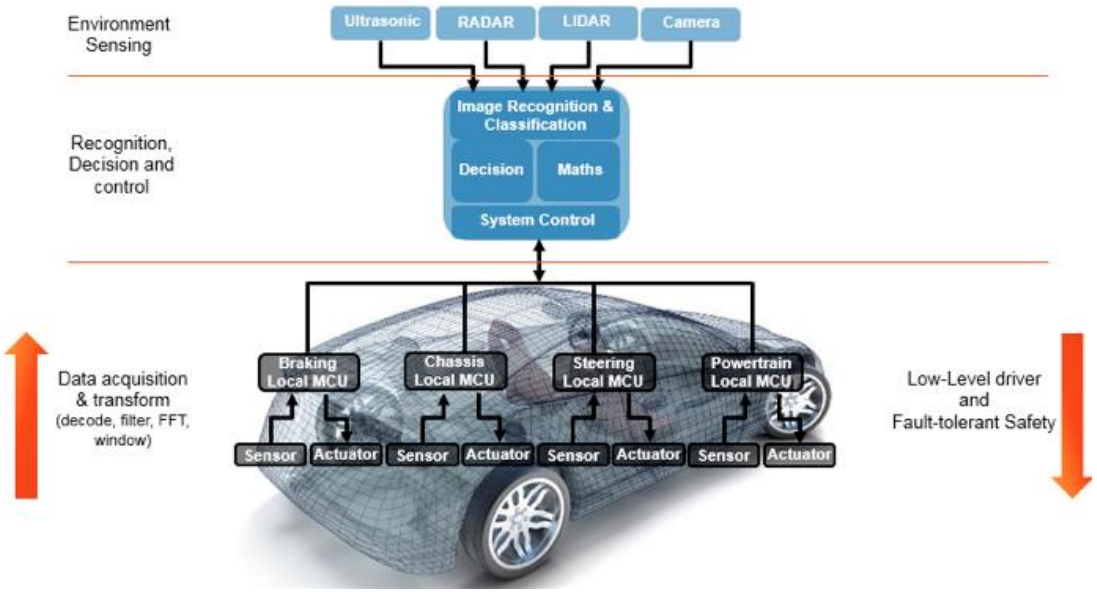
Context Prediction Use Cases

- Inferences on Intelligent Components' Future Context
- Increasing the Comfort Level of the Occupants
- Planning Passengers' Wellbeing
- Early Coordination of Individuals
- Power Management of the ECUs and Components
- Early Warning of Possible Dangers / Problems



Challenges in a Car

- Systems Work in Real Time
- Difficulty in Predicting Human Actions
- Data in Discrete Time
- High Heterogeneity of Data
- Limited Hardware Capabilities
- Minimum Learning Phase
- Lack of Suitable Automated Decision Making



Context Prediction in Autonomous Driving Seminar

Structure

Objectives

- Focus Will Be (Mostly) on the State-of-the-Art
- Practicing Team Work on an Academic Topic
- How to Read Scientific Works
- How to Write a Scientific Paper
- How to Revise a Scientific Work
- How to Present a Scientific Work

Getting Familiar with the Context Prediction Domain in Autonomous Driving

Topics

- Context Prediction and Service Oriented Architecture
- Challenges in Designing a Context Prediction Architecture
- Driver Behavior Modelling For Context Prediction
- Ambient Intelligent Systems
- Space Theory in Context Prediction
- Neural Networks and Deep Learning in Context Prediction
- Context Prediction and Reinforcement Learning
- Approaches for Optimizing the Accuracy of the Prediction Results
- Challenges of Deploying Neural Nets for Context Prediction in Fully Automated Driving
- Limitations of Deep Learning Methods in Context Prediction
- Trajectory Prolongation Approach (Interpolation/Approximation)

Grading

- Extracting the Related State-of-the-Art Resources (10%)
- Reading and Writing Seminar Papers (40%)
- Revising and Writing a Review (20%)
- Presentation of the Work (30%)

Attendance to the Presentation Sessions is Mandatory

Notes on Plagiarism

- Avoid Explicit Copy & Paste!
- Cite **any** Scientific Idea or Concept You Use!

What if …?

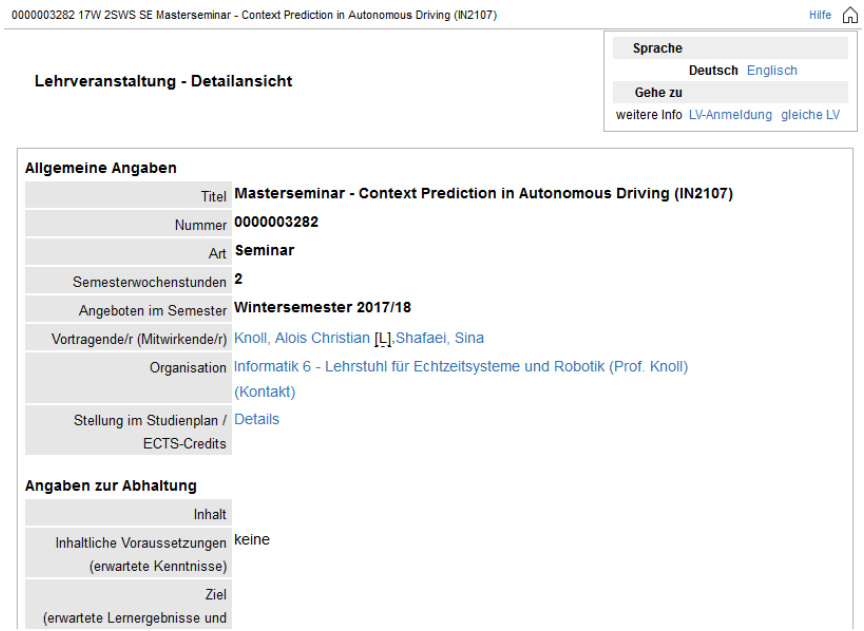
- Seminar Grade = 5.0
- The Responsible Department at TUM Will Initial the Investigation Officially

Procedure

1. Find a Partner and Choose a Topic
2. Email Me: Your Topic and Group Members (Title: SemCon17/18)
3. Extract the Related Papers and Resources to Your Topic
4. Each Group Needs to Review at Least 2 Scientific Paper
5. Write a Seminar Paper on Resources You've Reviewed
6. Email Me: Set Up a Meeting + Attach the First Draft, at least 4 pages (Title: FRSemCon17/18)
7. I Will Revise Your Work and Will Assign Other Groups Work to You for Revising
8. Submit Your Final Report + Write a Review (Min. 600 Words) on the Revised Version of the Other Groups' Work (Submit one Week Before the Presentation Day)
9. Present Your Work

Time Table

- Dates and Location Will be Announced in August
- Check the Web page of the Seminar
- First Session is in Mid. of October



0000003282 17W 2SWS SE Masterseminar - Context Prediction in Autonomous Driving (IN2107) Hilfe

Lehrveranstaltung - Detailansicht

Sprache
Deutsch Englisch
Gehe zu
weitere Info LV-Anmeldung gleiche LV

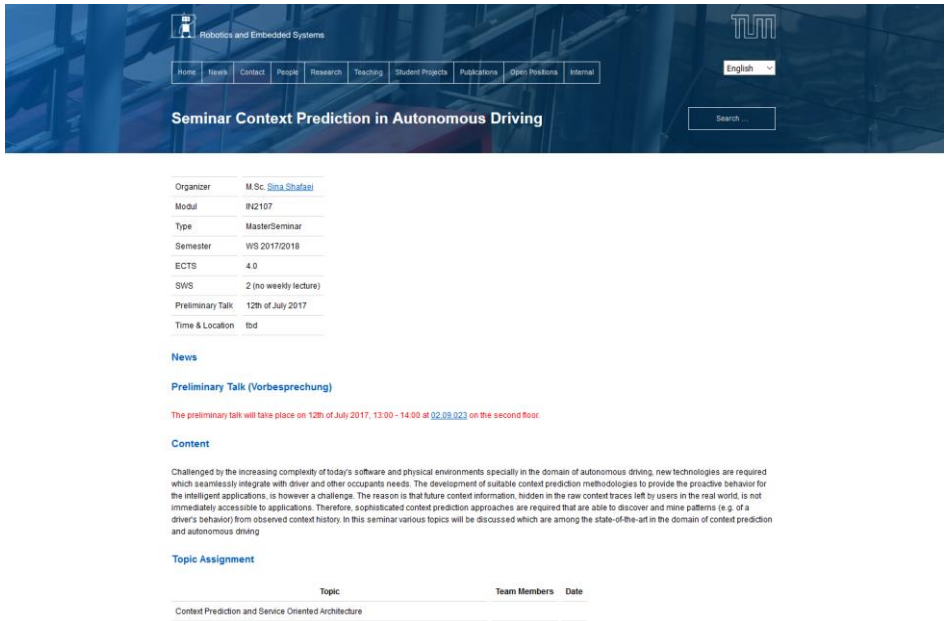
Allgemeine Angaben

Titel	**Masterseminar - Context Prediction in Autonomous Driving (IN2107)**
Nummer	**0000003282**
Art	**Seminar**
Semesterwochenstunden	**2**
Angeboten im Semester	**Wintersemester 2017/18**
Vortragende/r (Mitwirkende/r)	Knoll, Alois Christian [L],Shafaei, Sina
Organisation	Informatik 6 - Lehrstuhl für Echtzeitsysteme und Robotik (Prof. Knoll) (Kontakt)
Stellung im Studienplan / ECTS-Credits	Details

Angaben zur Abhaltung

Inhalt	
Inhaltliche Voraussetzungen (erwartete Kenntnisse)	keine
Ziel (erwartete Lernergebnisse und	

https://campus.tum.de



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English

Seminar Context Prediction in Autonomous Driving

Search ...

Organizer	M.Sc. Sina Shafaei
Modul	IN2107
Type	MasterSeminar
Semester	WS 2017/2018
ECTS	4.0
SWS	2 (no weekly lecture)
Preliminary Talk	12th of July 2017
Time & Location	tbd

News

Preliminary Talk (Vorbesprechung)

The preliminary talk will take place on 12th of July 2017, 13:00 - 14:00 at 02.09.023 on the second floor.

Content

Challenged by the increasing complexity of today's software and physical environments specially in the domain of autonomous driving, new technologies are required which seamlessly integrate with driver and other occupants needs. The development of suitable context prediction methodologies to provide the proactive behavior for the intelligent applications, is however a challenge. The reason is that future context information, hidden in the raw context traces left by users in the real world, is not immediately accessible to applications. Therefore, sophisticated context prediction approaches are required that are able to discover and mine patterns (e.g. of a driver's behavior) from observed context history. In this seminar various topics will be discussed which are among the state-of-the-art in the domain of context prediction and autonomous driving

Topic Assignment

Topic	Team Members	Date
Context Prediction and Service Oriented Architecture		

http://www6.in.tum.de/Main/TeachingWs2017ContextPredictionSeminar

If You Plan to Register and Participate

- Registration Via Matching System

- Send an Email to Shafaei@in.tum.de with Title "**ConPre1718**" by 30th of July

- Mention:
  1. Name and the Current Semester
  2. One Paragraph (Min. 100 Words) of Interest / Motivation (This is a Writing Sample as Well)

General Information and Resources

- IEEE latex template for Writing Scientific Papers
- Latex Editor For the Final Report
- A Good Reference on How to Write a Scientific Paper
- You Presentation Must **not** be Like This!
- A Useful Tool to Manage Your References and Citations