TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

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International Study Visit, Germany 27-31 Jan 2020

Bilkent University

Sedat OZER

sedat@cs.bilkent.edu.tr

International Study Visits of TARAL to EU Key Players

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Dept. of Computer Engineering, Bilkent University

- At the heart of the capital city: Ankara
  - Have access to many robotics companies, research hospitals and agencies in the region
- Our students are among the top in Turkey
  - Bilkent focuses on academic excellence
- Have multiple faculty researching on:
  - AI & Machine Learning
  - Robot Sensing & Computer Vision
  - Data Analysis fields

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Dr. Sedat Ozer - Education and Research Experience

EDUCATION

- **M.Sc.** from Univ. of Massachusetts, MA, USA
- **Ph.D.** from Rutgers University, NJ, USA

UMass

RUTGERS

RESEARCH

- Univ. of Central Florida (**UCF**), FL, USA between 2018 – 2019
  - Center for Research in **Computer Vision** (CRCV)
- Massachusetts Institute of Technology (**MIT**) between 2015 - 2017
  - **Distributed Robotics Lab**, CSAIL
- Univ. of Virginia, VA, USA, between 2013 - 2015
  - Virginia Image and **Video Analysis** (VIVA) lab

University of Central Florida

MIT CSAIL

University of Virginia

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About Me and My Research Team

- Recently joined the department and my team is growing:
  - By the end of this summer, will have 6 PhD students
  - 2 M.Sc. Students & 6 undergraduate students
  - Co-advising multiple M.Sc. and PhD students in various institutions
- My expertise is in:
  - AI Algorithm Design
  - Machine Learning Theory
  - Data Analysis & Visualization
  - Robot Sensing & Computer Vision

Collaborating Institutions

RUTGERS
UNIVERSITY of VIRGINIA
UMASS
University of Central Florida
PRINCETON UNIVERSITY
MIT
UCDAVIS UNIVERSITY OF CALIFORNIA
UNIVERSITY OF MARYLAND 18 56
TU Delft

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R&D

- I have worked on many projects funded by local agencies in USA.

- Currently, I am the PI on a TUBITAK 2232 project at Bilkent University
  - focuses on designing reliable object detection algorithms for autonomous systems

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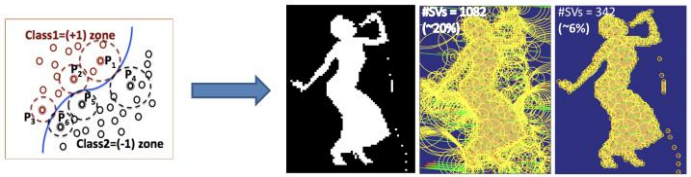
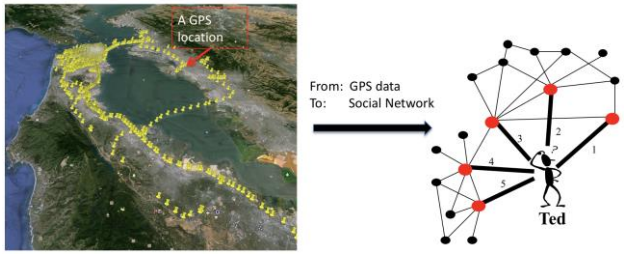
Sample Projects

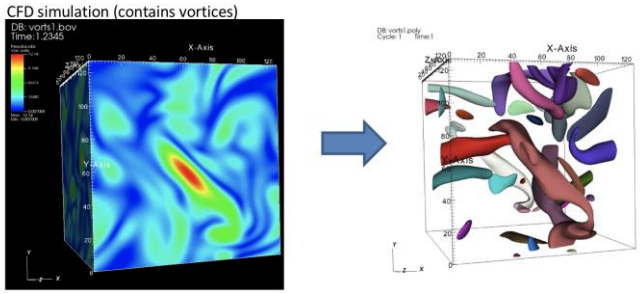
- Interpretable Machine Learning Algorithm Design, [IEEE TIP, 2019]



- Social Network extraction from streaming GPS data, [ICML 2017]



- Activity Detection in Scientific Datasets [IEEE TVCG 2013]
  - Object segmentation, tracking, and activity modelling,



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Video Data (Analysis) in Computer Vision

- **Object Detection**
- **Object Tracking**
- **Anomaly Detection**
- **Activity Detection**

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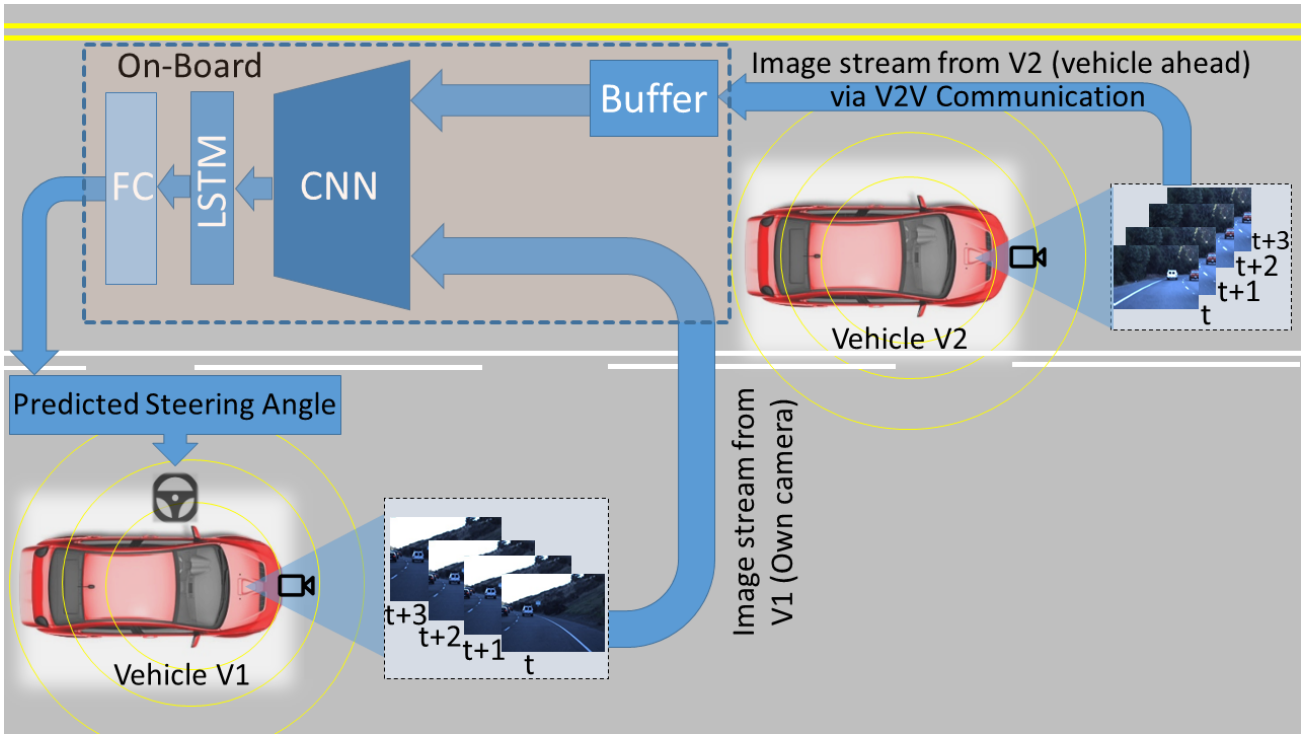
Controlling Steering Angle for a Self-driving Car in Cooperative Environments



Published at IEEE Intelligent Vehicles Symposium 2019

First vision paper using V2V communication

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Ideas: Multimodal Data Fusion for Robot Sensing

Horizon 2020:

- **ICT-46-2020**: Robotics in Application Areas and Coordination & Support
  - (**AI and Cognition**)

- **ICT-47-2020**: Research and Innovation boosting promising robotics applications
  - **Application and integration of non-visual sensing novel for service robotics**

    (Multi-modal fusion)
    - Chemical properties
    - Sound
    - Physical properties
      - Can be measured by cameras, etc.

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Ideas: Designing Explainable & Interpretable AI Algorithms

- Deep Reinforcement Learning for Enhancing **Robot Cognition**
- Deep Reinforcement Learning for **Cognitive Mechatronics**:
- GANs for **Robot Cognition**
- Learning to learn for **Robot Cognition**

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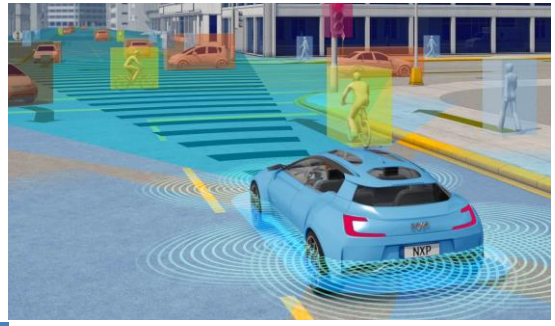
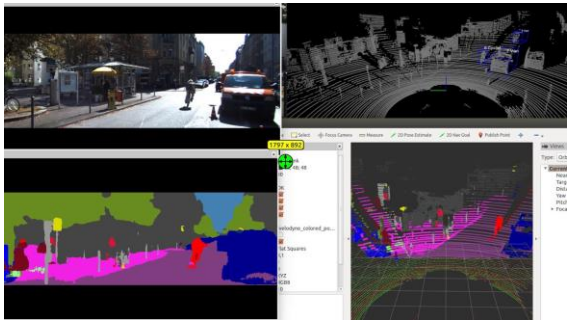
Ideas: AI for Autonomous Systems

- Object detection
- Tracking and
- Scene parsing





Multi-Modal Fusion
- RGB Image
- IR image
- LIDAR
- Sound

New Algorithm Design for AI-based Cognition for:
- For Autonomous Robots
- For Robot Navigation

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Consortium

I bring:

- **expertise and experience in AI algorithm design (AI, data fusion, data analysis, robot sensing / vision, visualization)** for consortium to use in various robotics applications
- **an international support** not only from Turkey but also from US (if needed)
- **connections to Turkish market:** Turkish Companies / Researchers
- **support with multiple PhD** and / or M.Sc. Students

- I am open to new collaborations in EU & looking for challenging problems to tackle with.

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