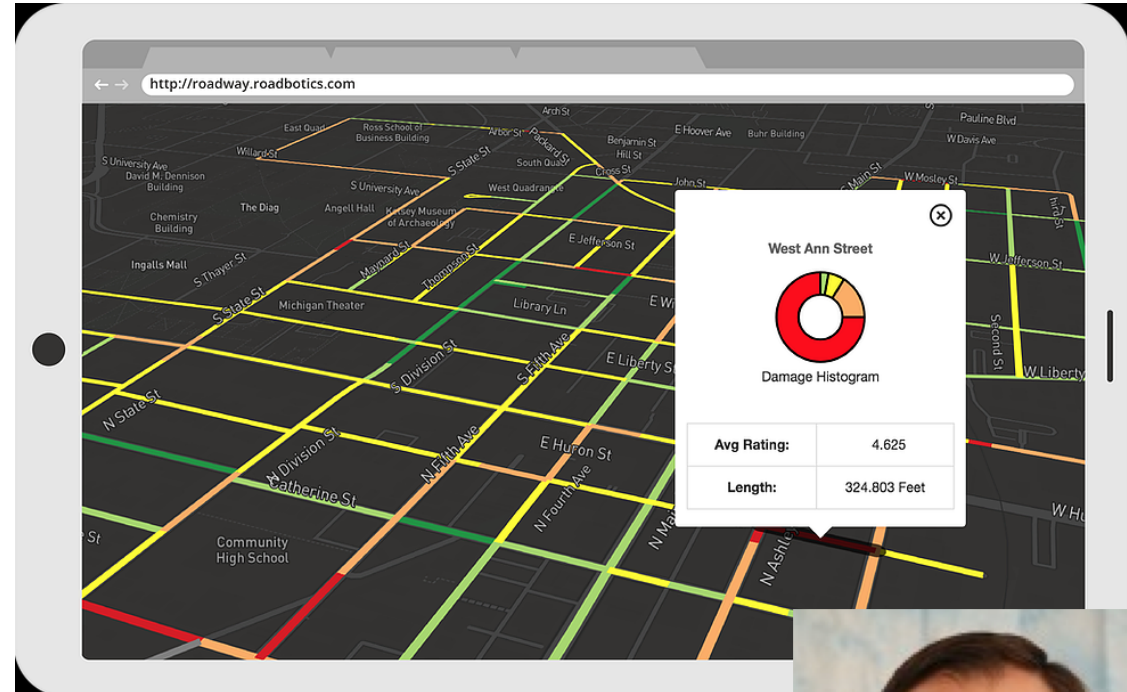




INNOVATIVE & DATA-DRIVEN TOOLS FOR PAVEMENT INSPECTION



75+ COMMUNITIES ASSESSED **14** STATES IN THE US **2,134,544** CITIZENS IMPACTED

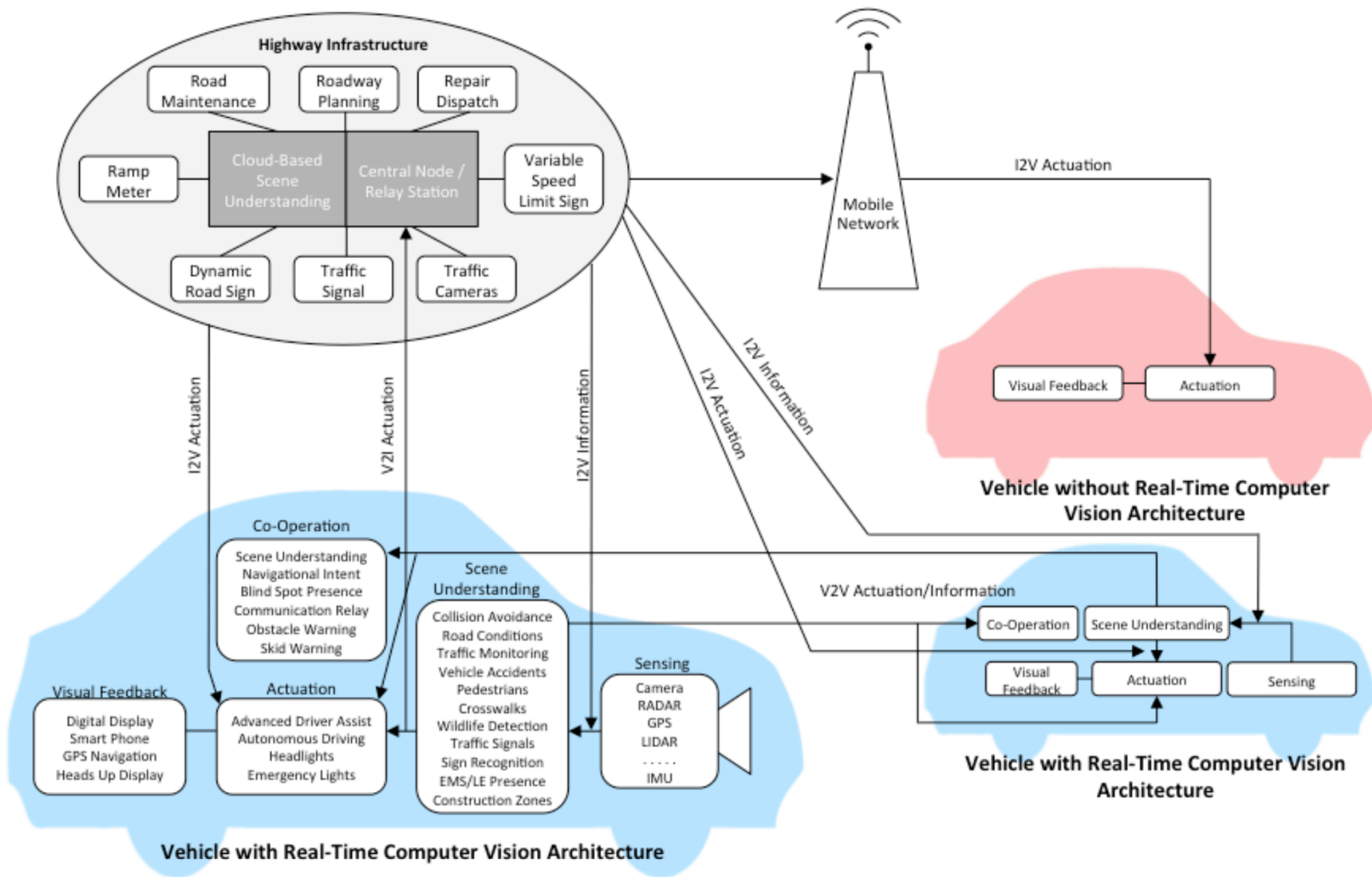
Founded 2016, 30+ Employees, >2 Million Investment

WINNER, 2018 American Society of Civil Engineers Innovation Contest

**Christoph Mertz, Co-Founder
Co-PI, CNS-1446601**



CNS-1446601, "CPS: Synergy: TTP: Anytime Visual Scene Understanding Cyber-Physical Systems"

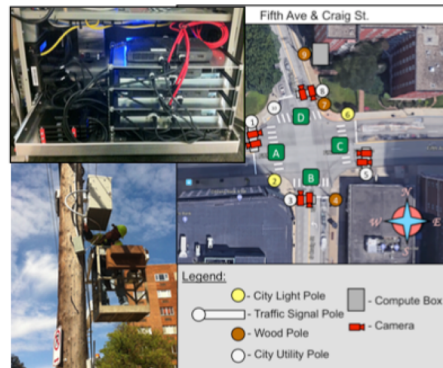


Synergy: Anytime Visual Scene Understanding for Heterogeneous and Distributed CPS

Srinivasa Narasimhan, Martial Hebert, Christoph Mertz, James Hoe
Carnegie Mellon University

Challenge

- CPS systems share limited information
- V2V limited to sharing speed/position
- V2I limited by region and re-routing



Connected Intersections with instrumented cameras and edge computing will permit real-time analysis and V2X communication of sparse data.



Automated Road Surface Condition Assessment from smartphone captured images and AI methods. Formed company RoadBotics to collect road data and perform analysis. Results provided to clients (e.g., all levels of government, planning organizations, and engineering/construction firms) as easy-to-ready color-coded maps on a web-based platform.

Solution and Scientific Impact

Vision-based architecture with:

- Integrated edge-cloud processing
- Hardware acceleration of anytime and coop. scene understanding methods
- Seamless communication of scene understanding (V2V and V2I)
- Managing security and privacy without impacting QoS



Adaptive Automotive Headlights can be programmed to react to the road environment in order to improve and enhance visibility for the driver. Awarded best research pitch at Three Rivers Venture Fair (2017).

Broader Impact

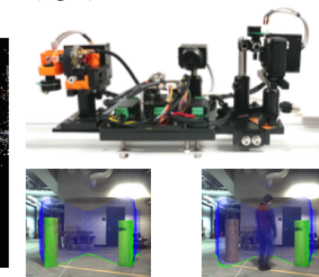
- Crash fatalities increasing annually
- Synergy between computer vision, machine learning and cyber-physical systems will lead to a safer, cheaper and smarter transportation sector
- Co-advised students, co-taught multi-disciplinary courses, co-organized workshops, deployment on the road



Cross-Modal Stereo Matching for the depth in the presence of challenging materials, e.g., glass, fabric, vegetation, lights, etc.



3D Reconstruction of vehicles and their spatiotemporal motion from multiple, unsynchronized cameras from different view points.



Object Detection with a light curtain that is low cost, low computation, programmable, and works in bright light and through scattered media.