

Tuesday, July 10

Speaker Name: John Kenney
Speaker Title: Director of Networking Research
Speaker Organization: Toyota InfoTechnology Center
Proposed Presentation Title: DSRC Deployment Progress and Support for Automated Driving

Presentation Description

DSRC is the V2X technology being deployed in the United States. With strong momentum stemming from the commitments of major automakers, state DOTs, and US DOT, the era of directly connected vehicles and infrastructure has begun. We can expect major safety and traffic efficiency benefits to follow. We also increasingly appreciate the ways in which V2X connectivity can lend support to Automated Driving functions. This brief talk will update the current progress in DSRC deployment and highlight how communication technologies, both at 5.9 GHz and in the millimeter wave band, can be used to improve AD.

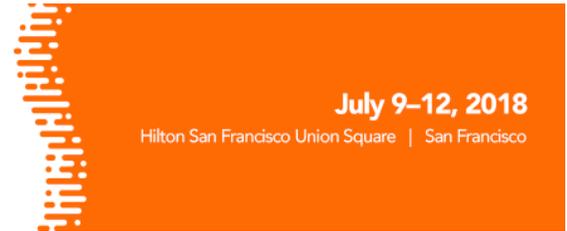
Speaker Name: Shailesh Patil
Speaker Title: Principal Engineer/Manager
Speaker Organization: Qualcomm
Proposed Presentation Title: Enhancing autonomous driving using 5G NR V2X communication

Presentation Description

Automobile industry is going a transformative change and moving towards autonomous driving. Such autonomous cars will be equipped several sensors such as radar, LIDAR etc. We discuss the need for and the value of V2X communication in presence of such sensors. We next discuss how V2X communication can enable and/or enhance autonomous driving. More particularly we discuss how V2X sensor sharing, and trajectory sharing can assist autonomous driving. Our results show that V2X can enhance/enable autonomous driving in significant ways. We further discuss how 5G V2X communication is needed to enable advanced V2X communication.



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Speaker Name: Steve Sill
Speaker Title: Program Manager Vehicle Safety Technology
Speaker Organization: National Highway Traffic Safety Administration
U.S. Department of Transportation

Proposed Presentation Title: Assessment Processes for Establishing Trust in V2X Communications

Presentation Description

As evidenced by General Motor’s and Toyota’s recent announcements related to offering vehicle-to-vehicle communications on production vehicles, significant factions within the automotive industry envision important safety and other benefits from connected vehicle technology. Additionally, several industry stakeholders have noted the role connectivity could play in enhancing automated vehicle operations. At the same time, the benefits from connected vehicle technology only “work” if messages are trusted by receiving vehicles. Key to establishing this trust will be the exchange of some type of security certificates that convey authenticity of the sender and integrity of the message. And, importantly, a necessary pre-requisite to obtaining such certificates [from commonly trusted security services provider(s)] will be certification of devices themselves showing evidence they meet agreed upon specifications. As such, a key aspect of realizing interoperable, device-to-device communications among vehicles, and between vehicles and the infrastructure, will be the emergence and operation of a commonly trusted and recognized certification eco-system. This presentation will: review the need for certification for various end-entities within the overall V2X network; identify potential certification bodies to fulfill anticipated functions; and discuss key challenges and next steps associated with the emergence and operation of a V2X certification eco-system.

Speaker Name: Dr. Allan Steinhardt
Speaker Title: Chief Engineer
Speaker Organization: AEye
Proposed Presentation Title: Pre-frame fusion

Presentation Description

In automotive sensing, safety is paramount. Time matters, literally lives depend on it. Two cars approaching each other at highway speeds become nearer by 150 feet in one second.

In order to obtain the "sense and respond" speed for braking and or diverting to avoid an obstacle we need to respond quickly.

In this talk, we will attempt to make the case that fusion data on a frame-to-frame basis is too slow. Instead, we will present approaches where fusion is conducted on a per-voxel or per-pixel level, which allows for microsecond scale fusion of lidar, radar, and video, as opposed to the nominal 100msec rates typical in first generation systems.

Speaker Bio: Dr. Allan Steinhardt

Dr. Steinhardt is among the world's most widely esteemed defense scientists. An IEEE fellow, Steinhardt is a sought-after expert on radar, missile defense, GMTI and space surveillance. He was Chief Scientist for DARPA, co-author of a book on adaptive radar, and assistant professor in Electrical Engineering and Applied Mathematics at Cornell University, where he performed funded research on sensor arrays and optimal detection capabilities. Dr. Steinhardt has also served as chief scientist at Booz Allen, the radar project lead at MIT Lincoln Laboratory, and director of signal processing for the defense Industry with BAE/Alphatech. He holds a bachelor's degree in Mathematics, and graduate degrees in Electrical and Computer Engineering from the University of Colorado, Boulder.



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About AEye:

AEye is an artificial perception pioneer and creator of iDAR™, a perception system that acts as the eyes and visual cortex of autonomous vehicles. Since its demonstration of its solid state LiDAR scanner in 2013, AEye has pioneered breakthroughs in intelligent sensing. The company is based in the San Francisco Bay Area, and backed by world-renowned investors including Kleiner Perkins Caufield & Byers, Airbus Ventures and Intel Capital. For more information, please visit www.aeye.ai.

Speaker Name: Dr. Louay Eldada
Speaker Title: CEO and Co-Founder
Speaker Organization: Quanergy
Proposed Presentation Title: How Solid State LiDAR Will Enable Self-Driving Cars



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Presentation Description

Dr. Louay Eldada has invested his whole life in LiDAR – he researched LIDAR for his Ph.D. at Columbia in the 90s and he’s continued to develop top-of-the-line LiDAR sensors for the past 25 years. With more attention than ever placed on the development of autonomous vehicles, modern consumers are increasingly familiar with LiDAR sensors and how they function. Few, however, realize that the large LiDAR sensors that they see on top of many self-driving prototype vehicles today likely are not the LiDAR sensors that will end up on the autonomous car that will be in their driveway. The sensor that will come standard in every sedan and SUV will be solid state – much smaller, significantly lower cost, and immensely more reliable. Dr. Eldada is working to develop this kind of LiDAR sensor in order to make self-driving tech accessible to the average car owner. In this session, he will speak to the potential of LiDAR in general, and solid state sensors in particular, to enable mass ownership of autonomous vehicles.

Speaker Bio: Louay Eldada

Louay Eldada is CEO and co-founder of Quanergy Systems, Inc. Dr. Eldada is a serial entrepreneur, having founded and sold three businesses to Fortune 100 companies. Quanergy is his fourth start-up. Dr. Eldada is a technical business leader with a proven track record at both small and large companies and with 71 patents, is a recognized expert in quantum optics, nanotechnology, photonic integrated circuits, advanced optoelectronics, sensors and robotics. Prior to Quanergy, he was CSO of SunEdison, after serving as CTO of HeliVolt, which was acquired by SK Energy. Dr. Eldada was earlier CTO of DuPont Photonic Technologies, formed by the acquisition of Telephotonics where he was founding CTO. His first job was at Honeywell, where he started the Telecom Photonics business and sold it to Corning. He studied business administration at Harvard, MIT and Stanford, and holds a Ph.D. in optical engineering from Columbia University.

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About Quanergy

Quanergy is the leading provider of LiDAR sensors and smart sensing solutions. Quanergy’s award-winning solutions are a disruptive development in 3D-aware smart sensing and fueling the exciting growth of LiDAR in over 40 industries, including self-driving vehicles, security, smart cities and industrial automation. The company’s solid state sensors are dramatically smaller than other sensors on the market, with no moving parts, and feature the durability required for industrial applications. The company’s software solutions enable real-time 3D object detection, tracking and classification. Quanergy sensors are disruptive in their cost, performance, reliability, size, weight and power consumption.

Speaker Name: Harri Santamala
Speaker Title: CEO
Speaker Organization: Sensible 4
Proposed Presentation Title: How to facilitate automated driving in all-season conditions

Presentation Description

Weather plays critical role in the performance of AV's. During heavy rain, fog or snow, Most of the current AV's and ADAS sensors and algorithms function very poorly, if at all. Varying weather forces the AV's to face new level of problems with can be classified to perception, positioning and dynamic control of the vehicles. Sensible 4 has been validating their L4 autonomous system in Arctic open road conditions as the extreme resembles well the most challenging situations for AV. Sensible 4's solution to the challenge lies within their Lidar data processing combined with sensor fusion, granting additional levels of redundancy to the system. Sensible 4 positioning is both highly robust and efficient. It is tolerant to both environment changes and different forms of rain. Yet it runs on fairly low-power CPU. This is further supported by smart sensor fusion used for both positioning and obstacle detection enabling AV's to overcome one key market-entry barrier.

Speaker Bio: Harri Santamala

Harri Santamala, "Mr. Robobus", CEO and co-founder of Sensible 4 - a company pioneering with all-season autonomous driving technologies. He was among the first to take automated buses to open-road conditions in 2016, this happened in Finland through SOHJOA – project, as well as he built the whole Finnish road automation ecosystem, now determined to stabilize Finland's international role in the forming of the market. Proactive and persistent, motivated by challenging current businesses and working towards the disruption in traffic. Public person (NY Times, CNN, Guardian etc), well connected internationally within the industry. Deep know-how in high level automotive systems, integration and vehicle development. Before founding Sensible 4, Harri has been actively working towards enabling AV's in Finland as well as developing Electric Vehicle's and their systems. Harri has his BSc. in Automotive Engineering in 2006 and his MSc. in Machine design from Aalto University in 2010.



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About Sensible 4

Sensible 4 is enabling the market entry of shared driverless vehicles by providing system which can drive autonomously all-year-round. Expertise built in one of the globally oldest outdoor robotic research groups since 1985, is utilized for our full-stack, platform agnostic, AV system currently in open-road winter testing. Sensible 4 team has built and demonstrated their first AV already in 1990 to 1993 and AV that could tackle harsh conditions and environments in 2004.

Our application knowledge in the real within-traffic self-driving pilots, mobile robotics and northern survival knowhow makes Sensible 4 the toughest vehicle automation system provider out there.

As a start-up with team of 20 persons, Sensible 4 is working towards providing the vital market enabling technology to possible OEM and Tier 1 parties in the industry in order to make the commercially viable SAE L4 AV a reality. The ability to operate 365 days per year gives us unique competitive advantage against other companies in the field and allows mobility service providers to invest in the fleets provided by our customers.

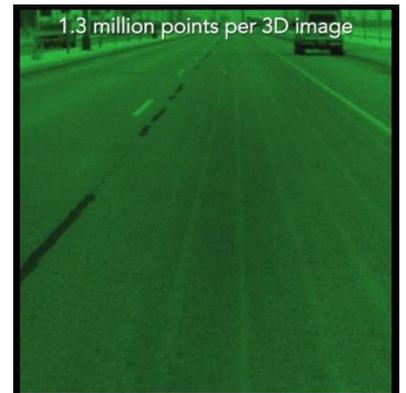
Speaker Name: Jamie Retterath
Speaker Title: Chief Product Officer
Speaker Organization: Vergence Automation
Proposed Presentation Title: 4D Camera Sensor for Challenging Environments



Presentation Description

Higher level automated driving systems will rely heavily on a suite of sensors. This session brings together the sensor technology experts to describe the benefits of various sensors. A panel discussion will allow for a deeper dive into best methods for sensor utilization and remaining challenges for system developers.

Jamie Retterath is Chief Product Officer for Vergence Automation. The Vergence 4D camera produces images with up to 40 million 3D points per second through a Lighting-invariant Imaging Model (LiIM) that allows for road feature identification in less-than-ideal imaging conditions. When implemented in on-board systems and as a feature layer in the HAD map, the 4D camera enables true dynamic mapping at the network level enabling MaaS (Maps as a Service). This presentation will describe the LiIM and how it enhances the the ability of on-board mapping systems.



Speaker Bio: Jamie Retterath

Jamie Retterath is the Chief Product Officer for Vergence Automation, Inc. Jamie has a BS in Electrical Engineering and an MBA from the University of Minnesota. A recipient of over 33 patents, Jamie has developed many of the methods and practices used by mobile mapping companies for asset management digital map creation.

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About: Vergence Automation

Vergence Automation is an automated driving system sensor technology company seeking to re-make the technology stack for Level 3 through Level 5 autonomous vehicle navigation.

Vergence's first contribution is the launch of the 4D Camera, which uses a Lighting-invariant Imaging Model (LiIM) to produce high-resolution 3D roadway imagery without the need for sensor fusion. The 4D Camera with LiIM produces navigation-ready 3D imagery in all lighting scenarios and all atmospheric conditions, thus overcoming the situational availability limitations of the passive camera or the stereo camera in present-day autonomous navigation systems.



Vergence is presently working with key stakeholders in the navigation technology stack to produce a system that will provide safe, reliable navigation on all roadways, not just the chosen few roadways that have special wiring or lanes that are dedicated for autonomous vehicles. Key stakeholders included HAD map suppliers, dynamic mapping software suppliers, mobile mapping companies, Tier 1 sensor providers, Tier 1 navigation ADAS suppliers, and infrastructure material suppliers.

Speaker Name: Jason Eichenholz
Speaker Title: Co-Founder and CTO
Speaker Organization: Luminar
Proposed Presentation Title: Long-Range LIDAR is the Key to a Safe and Ubiquitous Self-Driving Future

Presentation Description



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Autonomous vehicles would not be able to operate safely without an accurate, real-time, 3D representation of the environment. These cars are able to “see” by leveraging a number of vision technologies, the most important of which is LiDAR, a sensor that relies on lasers to detect objects in much the same way radar relies on radio waves. Luminar has developed the first scalable, long-range LiDAR system powerful enough to enable safe and ubiquitous autonomous driving.

CTO and co-founder Jason Eichenholz will enlighten the audience with the Luminar founding story, the unique design approach that makes Luminar’s LiDAR the “gold standard” and the future challenges for the industry. Jason is a serial entrepreneur and pioneer in laser, optics and photonics product development and commercialization. He is a fellow of SPIE and OSA and is an inventor on more than twenty U.S. patents on new types of solid-state lasers, displays and photonic devices.

Speaker Name: Maha Achour, PhD
Speaker Title: CEO
Speaker Organization: Metawave
Proposed Presentation Title: The Future of Automotive Radar - Leveraging Metamaterial Antennas and Intelligent Algorithms

Presentation Description

Improvements in digital beamforming (DBF) radars are incremental, as the technology approaches theoretical limits in performance. Metawave is building a new class of long-range radar sensor technology capable of significantly exceeding these limits. It is based on two key-enabling building blocks. Metamaterial Frequency-Adaptive Steering Technology (M-FAST) is a single-port electronically-steerable antenna, powered by an Intelligent Antenna Metamaterial (IAM) interface, which serves as a bridge between the analog antenna, radio micro-controller and transceiver). This innovation will enable level 4 & 5 autonomous vehicles operating at any speed, and in all-weather and driving conditions. This presentation will review the fundamentals of M-FAST and IAM, and share the design of a 77 GHz broadband radar sensor.