NVIDIA and Toyota Research Institute-Advanced Development Partner to Create Safer Autonomous Transportation

Collaboration to Accelerate Use of Autonomous Vehicles and AI Technologies Expands to New Testing and Validation System

GPU Technology Conference■ -- Toyota Research Institute-Advanced Development (TRI-AD) and NVIDIA today announced a new collaboration to develop, train and validate self-driving vehicles.

The partnership builds on an ongoing relationship with Toyota to utilize the NVIDIA DRIVE AGX Xavier™ AV computer and is based on close development between teams from NVIDIA, TRI-AD in Japan and Toyota Research Institute (TRI) in the United States. The broad partnership includes advancements in:

- AI computing infrastructure using NVIDIA GPUs
- Simulation using the NVIDIA DRIVE Constellation™ platform
- In-car AV computers based on DRIVE AGX Xavier or DRIVE AGX Pegasus™

The agreement includes the development of an architecture that can be scaled across many vehicle models and types, accelerating the development and production timeline, and simulating the equivalent of billions of miles of driving in challenging scenarios.

"Our vision is to enable self-driving vehicles with the ultimate goal of reducing fatalities to zero, enabling smoother transportation, and providing mobility for all,'' said Dr. James Kuffner, CEO of TRI-AD. "Our technology collaboration with NVIDIA is important to realizing this vision. We believe large-scale simulation tools for software validation and testing are critical for automated driving systems.''

NVIDIA founder and CEO Jensen Huang added, "Self-driving vehicles for everyday use and commercial applications in countless industries will soon be commonplace. Everything that moves will be autonomous. Producing all these vehicles at scale will require a connected collaboration for all elements of the system. Our relationship with TRI-AD and TRI is a model for that collaboration.''

AI, and specifically deep learning, has become a vital tool for the production of next-generation automated vehicles, particularly because of the need to recognize and handle the nearly infinite number of scenarios encountered on the road.

Simulation has proven to be a valuable tool for testing and validating AV hardware and software before it is put on the road. As part of the collaboration, TRI-AD and TRI are utilizing the NVIDIA DRIVE Constellation platform for components of their simulation workflow.

DRIVE Constellation is a data center solution, comprising two side-by-side servers. The first server -- Constellation Simulator -- uses NVIDIA GPUs running DRIVE Sim™ software to generate the sensor output from a virtual car driving in a realistic virtual world. The second server -- Constellation Vehicle -- contains the DRIVE AGX car computer, which processes the simulated sensor data. The driving decisions from Constellation Vehicle are fed back into Constellation Simulator, aiming to realize bit-accurate, timing-accurate hardware-in-the-loop testing.

This end-to-end simulation toolchain will help enable Toyota, TRI-AD and TRI to bring automated vehicles to market.

About TRI-AD
Toyota Research Institute-Advanced Development, Inc. focuses on the advanced development of software for automated driving efforts. Its mission is to build the world's safest automated driving car, as well as strengthening coordination with Toyota Research Institute (TRI) and the research and advanced development teams within the Toyota Group. Activities include developing automated driving software, leveraging data-handling capabilities and creating a straight line from research to commercialization. See more at www.tri-ad.global.

About TRI
Toyota Research Institute is a wholly owned subsidiary of Toyota Motor North America under the direction of Dr. Gill Pratt. The company, established in 2016, aims to strengthen Toyota's research structure and has four initial mandates: 1) enhance the safety of automobiles, 2) increase access to cars to those who otherwise cannot drive, 3) translate Toyota's expertise in creating products for outdoor mobility into products for indoor mobility, and 4) accelerate scientific discovery by applying techniques from artificial intelligence and machine learning. TRI is based in the United States, with offices in Los Altos, Calif., Cambridge, Mass., and Ann Arbor, Mich. For more information about TRI, see www.tri.global.

About NVIDIA
NVIDIA's (NASDAQ: NVDA) invention of the GPU in 1999 sparked the growth of the PC gaming market, redefined modern computer graphics and revolutionized parallel computing. More recently, GPU deep learning ignited modern AI — the next era of computing — with the GPU acting as the brain of computers, robots and self-driving cars that can perceive and understand the world. More information at http://nvidianews.nvidia.com/.

Certain statements in this press release including, but not limited to, statements as to: the benefits and impact of NVIDIA, Toyota, Toyota Research Institute-Advanced Development and Toyota Research Institute's partnership and its acceleration of the use of autonomous vehicles and AI technologies; the goals and advancements of the partnership between NVIDIA, Toyota, Toyota Research Institute-Advanced Development and Toyota Research Institute; enabling self-driving vehicles, reducing fatalities, enabling smoother transportation and providing mobility; large-scale simulation tools being critical for automated driving systems; self-driving vehicles soon being common place; everything that moves being autonomous; producing autonomous vehicles requiring a connected collaboration for all elements of the system; AI becoming a vital tool for the production of automated vehicles; TRI-AD and TRI utilizing NVIDIA DRIVE Constellation; the benefits, abilities and performance of NVIDIA DRIVE Constellation; and NVIDIA's end-to-end toolchain enabling automated vehicles to come to market are forward-looking statements that are subject to risks and uncertainties that could cause results to be materially different than expectations. Important factors that could cause actual results to differ materially include: global economic conditions; our reliance on third parties to manufacture, assemble, package and test our products; the impact of technological development and competition; development of new products and technologies or enhancements to our existing

product and technologies; market acceptance of our products or our partners' products; design, manufacturing or software defects; changes in consumer preferences or demands; changes in industry standards and interfaces; unexpected loss of performance of our products or technologies when integrated into systems; as well as other factors detailed from time to time in the most recent reports NVIDIA files with the Securities and Exchange Commission, or SEC, including, but not limited to, its annual report on Form 10-K and quarterly reports on Form 10-Q. Copies of reports filed with the SEC are posted on the company's website and are available from NVIDIA without charge. These forward-looking statements are not guarantees of future performance and speak only as of the date hereof, and, except as required by law, NVIDIA disclaims any obligation to update these forward-looking statements to reflect future events or circumstances.

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