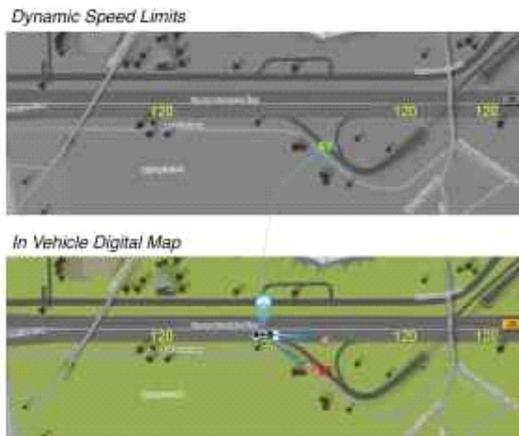March 6, 2017

HARMAN Pioneers Deep Learning Solution for Automotive Map Live Layer Data Updates

Leverages sensor fusion technology to analyze safety and camera data to intelligently update map data

GENEVA--(BUSINESS WIRE)-- Geneva Motor Show - HARMAN International (NYSE:HAR), the premier connected technologies company for automotive, consumer and enterprise markets, today announced an industry-first solution for automakers that addresses the industry-wide problem of stagnant map data for embedded navigation and ADAS systems.

This Smart News Release features multimedia. View the full release here:
http://www.businesswire.com/news/home/20170306005061/en/

Dynamic speed limits, which exist in the cloud, side-by-side with an in-vehicle digital map (Graphic: Business Wire)

HARMAN's new dynamic map layers solution, powered by HARMAN's compute platform, dynamically identifies differences between on-board map data and real-world information being captured through a vehicle's Advanced Driver Assistance Systems (ADAS), navigation system and on-board sensors. The solution is already deployed in the market with a major German automaker.

The dynamic map layers solution uses data collected from cameras and other car sensors to recognize road signs from the surrounding environment and compares it with the digital map information from the onboard navigation system. If a difference is detected, the information is anonymized and sent to the cloud, where HARMAN's scalable cloud platform analyzes the data collected from other similarly-equipped production vehicles. Using spatial machine learning techniques, the solution can then, in real time, deliver critical updates back to the road network. Taking ADAS and navigation to the next level, map layers also updates vehicles with critical map details to ensure that the connected car and its driver are up to date about road conditions ahead.

The solution will keep ADAS and navigation systems up-to-date with speed limit changes, warn drivers of upcoming construction zones and any other signs they may encounter on the road. HARMAN has also developed advanced hybrid learning algorithms that ensure the highest quality update, while achieving a small footprint on the embedded device and highly efficient over-the-air data transfer.

HARMAN's solution is based on the Navigation Data Standard (NDS), meaning that dynamic map layers information could be shared among different vehicle makes and models that also use NDS for navigation purposes. As the solution is deployed across automakers, it will offer up broader industry-wide benefits as OEMs can collaborate in building comprehensive, real-time representations of the road network.

As the number of sensors in cars increase, this same standards-based solution can be used to create updates to existing road maps, and even support the necessary high-definition map content required for various safety and autonomy applications within the connected car.

"After more than two years of collecting data and learning from production cars, we are thrilled to introduce this technology

to the market. By harnessing the power of HARMAN's software and deep experience with ADAS and navigation, we have created an automotive grade solution that will keep drivers safe," said Mike Tzamaloukas, vice president, Autonomous Drive Business Unit, a HARMAN Connected Car Division. "As more cars on the road begin using this technology, our deep neural networks algorithms will develop guardian driver skills that we will all grow accustomed to using in our everyday drive experience."

ABOUT HARMAN

HARMAN (harman.com) designs and engineers connected products and solutions for automakers, consumers, and enterprises worldwide, including connected car systems, audio and visual products, enterprise automation solutions; and connected services. With leading brands including AKG®, Harman Kardon®, Infinity®, JBL®, Lexicon®, Mark Levinson® and Revel®, HARMAN is admired by audiophiles, musicians and the entertainment venues where they perform around the world. More than 25 million automobiles on the road today are equipped with HARMAN audio and connected car systems. The Company's software services power billions of mobile devices and systems that are connected, integrated and secure across all platforms, from work and home to car and mobile. HARMAN has a workforce of approximately 30,000 people across the Americas, Europe, and Asia and reported sales of $7.2 billion during the 12 months ended December 31, 2016. The Company's shares are traded on the New York Stock Exchange under the symbol NYSE:HAR.

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Source: HARMAN International Industries, Incorporated

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