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No. 2971

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Mitsubishi Electric Develops Machine-learning Technology That Detects Cognitive Distractions in Drivers

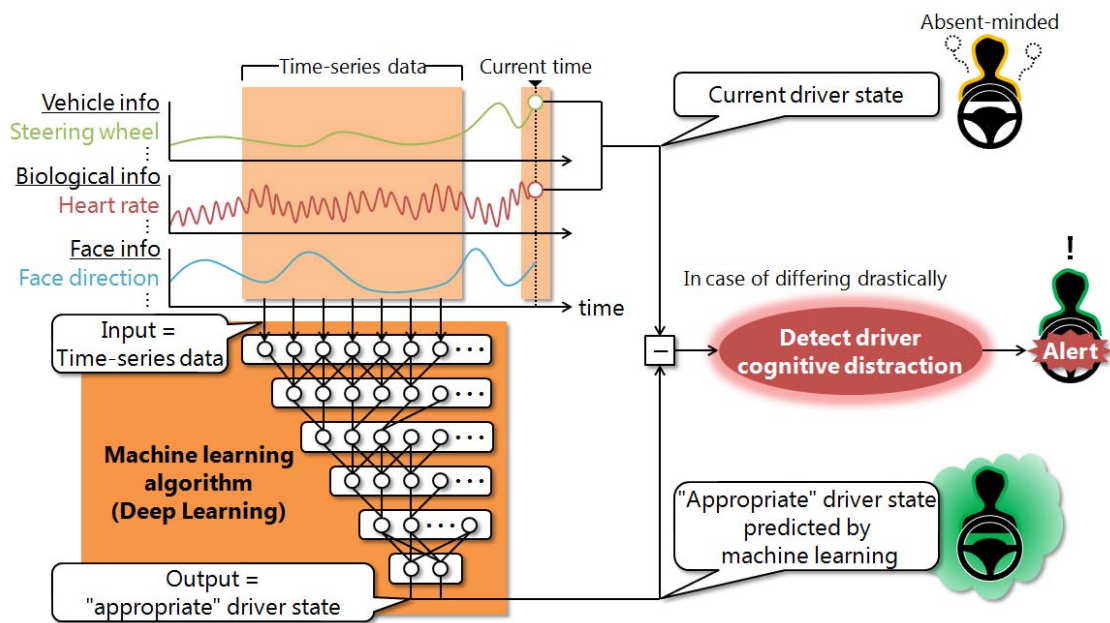
TOKYO, October 27, 2015 – [Mitsubishi Electric Corporation](#) (TOKYO: 6503) announced today it has developed a technology to detect absent-mindedness and other cognitive distractions in drivers when their vehicles are traveling straight, using a type of machine-learning algorithm known as deep learning. The company believes this is a first in the automotive industry.

Although systems exist to detect drivers who are visually distracted due to drowsiness or inattentiveness, the detection of cognitive distractions has been difficult because symptoms sometimes appear in a driver's behavior or biological patterns, rather than in their face or eye movements. Mitsubishi Electric's new technology uses a machine-learning algorithm to analyze time-series data, including information about the vehicle (steering, etc.) and driver (heart rate, facial orientation, etc.), to detect and warn drivers about potentially dangerous indications.

Key Features

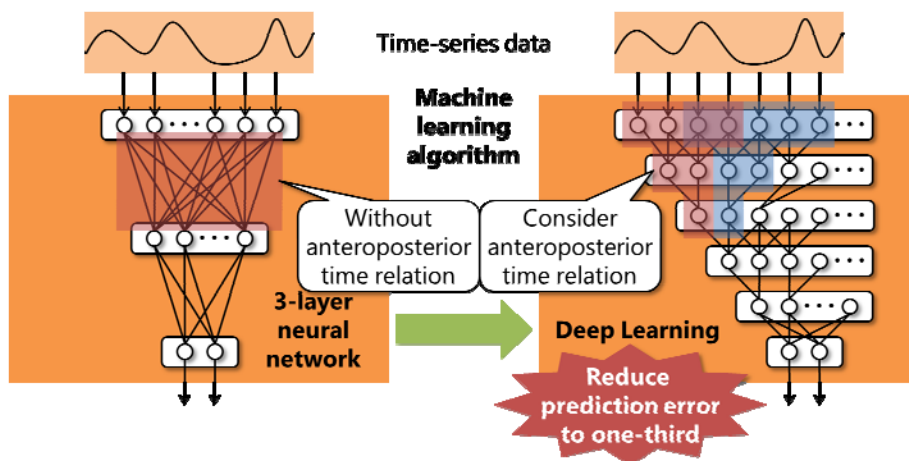
Predicting appropriate driving actions based on time-series data

- The machine-learning algorithm uses a combination of data on "normal driving" and time-series data on the actual vehicle and driver to predict appropriate driver actions in real time.
- The technology detects cognitive distractions if the driver's actions differ drastically from the algorithm-based prediction of what would be appropriate.
- If a distraction is detected, the driver is alerted immediately about their potentially dangerous driving.



Industry's first application of deep learning technology using machine-learning algorithm

Deep learning enables machines to use both forward- and backward-moving time-series data, which helps to reduce errors in predicting driver actions by 66 percent compared to Mitsubishi Electric's conventional algorithm, a so-called the three-layer neural network.



The technology will be displayed during the 44th Tokyo Motor Show 2015 at the Tokyo Big Sight exhibition complex in Tokyo, Japan from October 29 to November 8.

Technologies for detecting cognitively and visually distracted driving are expected to be installed in driver sensing units sold commercially from around 2019 or beyond.

Background

The market for advanced driver assistance systems (ADAS) is expected to reach 1.08 trillion yen (approximately US\$ 9 billion) by 2025, according to the Fuji Chimera Research Institute, Inc. While full self-driving automation (Level 4) is envisioned reaching the stage of practical use in around 2030, the limited self-driving automation incorporating human intervention requires driver-sensing and distraction-detection technologies.

According to Tokyo Metropolitan Police Department statistics from 2014, the most common cause of traffic fatalities is drowsiness or absent-minded driving (17.9 percent), while the second leading cause is inattentive driving (14.0 percent). Cognitive-distraction detection is expected to help significantly to reduce fatalities because absent-minded driving is known to occur more often than drowsy driving.

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About Mitsubishi Electric Corporation

With over 90 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded consolidated group sales of 4,323.0 billion yen (US\$ 36.0 billion*) in the fiscal year ended March 31, 2015. For more information visit:

<http://www.MitsubishiElectric.com>

*At an exchange rate of 120 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2015