Press Release

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AI Framework Learns Individual Driver Characteristics to Create Personalized Autonomous Driving

eSOL Announces Development of its eBRAD AI framework

The use of psychological domain knowledge allows design reviews and enable AI generation from small datasets

Tokyo, Japan. September 28, 2018 -eSOL, a leading developer of real-time embedded software solutions, today announced that it is developing eBRAD* (the eSOL BehavioR ADaptation engine), an AI framework that can control autonomous driving and other kinds of automation in the form of an AI personalized to the characteristics and behaviors of human drivers.

The announcement will be made today by Masaki Gondo, CTO and General Manager, Engineering Division, at the eSOL Technology Forum 2018, a private conference hosted by eSOL.

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eBRAD is a framework that incorporates knowledge of autonomous driving, in the form of an AI personalized to the characteristics and behaviors of human drivers. The three steps of autonomous driving are recognition, judgment and control. This decision-making algorithm determines the driving actions that in turn determine vehicle behavior. While the majority of autonomous driving systems currently attempt to behave homogeneously like an ideal averaged driver, prior researches of driving behavior have found significant variations in the way people drive: there are large differences between what each person considers to be "normal driving", depending on several parameters like location, climate conditions, car model, or driver personality. eBRAD provides a way to generate decision-making models that are personalized based on how people actually drive. This helps to deliver autonomous driving functions that feel more natural and human-like. The algorithms also help make the manual driving Advanced Driver-Assistance Systems (ADAS) safer and less intrusive, by predicting driver actions and adapting to the driving characteristics of a particular individual.

Another aspect of the design is the ability to conduct design reviews, a vital part of software quality assurance. This property is retained because it is the system developer who designs the core network structure of the AI, using existing domain knowledge about driver behavior psychology. This also means that analyses can be conducted when problems arise. Additionally, because the core structure is provided, the volume of data required in the machine learning phase is much lower than for deep learning, to a level that the vital data on individual drivers needed for personalization can be obtained, and AI training conducted, in a realistic timeframe.

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The eBRAD SDK provides a comprehensive toolset to use the AI framework together with a runtime engine, to incorporate the algorithm into target systems. Development of the runtime draws on the OS technology and expertise in advanced parallelization using multi/many-core processors that eSOL has built up over many years, combining a high level of performance and efficiency with the prospect of support for functional safety certification.

Beyond automotive applications like autonomous driving (AD) systems and ADAS, the technology also has potential uses in other systems where human actions can be automated. eSOL intends to work with partners to also offer support for applications outside AD and ADAS.

By making the eBRAD SDK commercially available, eSOL will support the development of both the next generation of autonomous driving systems and of automated and semi-automated systems in other industries, including healthcare.

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eSOL CTO and General Manager, Engineering Division Masaki Gondo commented that "In this time of innovation when advances in automation are taking place in automotive as well as many other sectors, I believe that eBRAD offers an extremely effective way to address the growing challenge of making AI less homogeneous and more personalized. It also offers an approach that takes full advantage of the domain knowledge that represents the greatest core asset of the system manufacturers who have been our customers for many years, without relying on large amounts of data and computational resources. Rather than a world in which data is everything, the aim is to provide system manufacturers with a new tool that utilizes data, but on a base of knowledge and expertise."

■For Reference

About eSOL Co., Ltd.
Founded in 1975, eSOL is a leading company in the embedded systems and IoT sector that seeks to create a rich IoT society using its innovative computer technologies. eSOL's software platform products and professional services, centered around its real-time operating system technology, are used worldwide in every field, starting with automotive systems, which conform to the most stringent quality standards, and including industrial equipment, satellites, and digital consumer electronics. In addition to the research and development of its own leading-edge products, and joint research with major manufacturers and universities, eSOL is actively engaged in AUTOSAR and Multi/Many-Core technology standardization activities.

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