**News Release**

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**Renesas and Fixstars to Jointly Develop Tools Suite that Optimizes AD and ADAS AI Software for R-Car SoCs**

*Shorten Development Cycles by Enabling Rapid Development of*

*Optimized Network Models and High-Speed Simulation*

**Düsseldorf, December 15, 2022 ―** Renesas Electronics Corporation (TSE:6723), a premier supplier of advanced semiconductor solutions, and Fixstars Corporation, a global leader in multi-core CPU/GPU/FPGA acceleration technology, today announced the joint development of a suite of tools that allows optimization and fast simulation of software for autonomous driving (AD) systems and advanced driver-assistance systems (ADAS) specifically designed for the R-Car system-on-chip (SoC) devices from Renesas. These tools make it possible to rapidly develop network models with highly accurate object recognition from the initial stage of software development that take advantage of the performance of the R-Car. This reduces post-development rework and thereby helps shorten development cycles.

“Renesas continues to create integrated development environments that enable customers to adopt the “software-first” approach,” **said Hirofumi Kawaguchi, Vice President of the Automotive Software Development Division at Renesas.** “By supporting the development of deep learning models tailored to R-Car, we help our customers build AD and ADAS solutions, while also reducing the time to market and development costs.”

“The [GENESIS for R-Car](https://www.renesas.com/software-tool/cloud-based-deep-learning-performance-evaluation-tool-genesis-r-car#overview), which is a cloud-based evaluation environment that we built jointly with Renesas, allows engineers to evaluate and select devices earlier in the development cycles and has already been used by many customers,” **said Satoshi Miki, CEO of Fixstars**. “We will continue to develop new technologies to accelerate machine learning operations (MLOps) that can be used to maintain the latest versions of software in automotive applications.”

Today’s AD and ADAS applications use deep learning to achieve highly accurate object recognition. Deep learning inference processing requires massive amounts of data calculations and memory capacity. The models and executable programs on automotive applications must be optimized for an automotive SoC, since real-time processing with limited arithmetic units and memory resources can be a challenging task. In addition, the process from software evaluation to verification must be accelerated and updates need to be applied repeatedly to improve the accuracy and performance. Renesas and Fixstars have developed the following tools designed to meet these needs.

**1. R-Car Neural Architecture Search (NAS) tool for generating network models optimized for R-Car**

This tool generates deep learning network models that efficiently utilize the CNN (convolutional neural network) accelerator, DSP, and memory on the R-Car device. This allows engineers to rapidly develop lightweight network models that achieve highly accurate object recognition and fast processing time even without a deep knowledge or experience with the R-Car architecture.

**2. R-Car DNN Compiler for compiling network models for R-Car**

This compiler converts optimized network models into programs that can make full use of the performance potential of R-Car. It converts network models into programs that can run quickly on the CNN IP and also performs memory optimization to enable high-speed, limited-capacity SRAM to maximize its performance.

**3. R-Car DNN Simulator for fast simulation of compiled programs**

This simulator can be used to rapidly verify the operation of programs on a PC, rather than on the actual R-Car chip. Using this tool, developers can generate the same operation results that would be produced by R-Car. If the recognition accuracy of inference processing is impacted during the process of making models more lightweight and optimizing programs, engineers can provide immediate feedback to model development, therefore shortening development cycles.

Renesas and Fixstars will continue to develop software for deep learning with the joint “[Automotive SW Platform Lab](https://www.renesas.com/about/press-room/renesas-and-fixstars-establish-automotive-sw-platform-lab-develop-software-and-operating)” and build operation environments that maintain and improve recognition accuracy and performance by continuously updating network models.

**Availability**

The first set of tools available today is designed for the [R-Car V4H SoC](https://www.renesas.com/products/automotive-products/automotive-system-chips-socs/r-car-v4h-best-class-deep-learning-very-low-power-system-chip-automated-driving-level-2-level-3#overview) for AD and ADAS applications that combines powerful deep-learning performance of up to 34 tera operations per second (TOPS) with superior energy efficiency. For more information, please visit:
<https://www.renesas.com/software-tool/tools-optimize-ai-software-adadas-r-car-soc>

**About Renesas Electronics Corporation**

Renesas Electronics Corporation ([TSE: 6723](http://www.jpx.co.jp/english/)) empowers a safer, smarter and more sustainable future where technology helps make our lives easier. A leading [global](https://www.renesas.com/about/company/profile/global.html) provider of microcontrollers, Renesas combines our expertise in embedded processing, analog, power and connectivity to deliver complete semiconductor solutions. These Winning Combinations accelerate time to market for automotive, industrial, infrastructure and IoT applications, enabling billions of connected, intelligent devices that enhance the way people work and live. Learn more at [renesas.com](http://www.renesas.com/). Follow us on [LinkedIn](https://www.linkedin.com/company/renesas/), [Facebook](https://www.facebook.com/RenesasElectronics/), [Twitter](https://twitter.com/renesasglobal), [YouTube](https://www.youtube.com/user/RenesasPresents) and [Instagram](https://www.instagram.com/renesas_global/).

**About Fixstars Corporation**

Fixstars is devoted to “Speed up your Business”.

Combining our expertise in multi-core processor programming and the use of next-generation memory technology, we provide the best performance solutions, as well as power savings to accelerate customers' businesses in various fields. For more information, please visit: <https://www.fixstars.com/en/>

(Remarks) This product contains technology that came from a practical application of a project by the New Energy and Industrial Technology Development Organization (NEDO) in Japan, named "Project for Innovative AI Chip and Next-Generation Computing Technology Development.” All names of products or services mentioned in this press release are trademarks or registered trademarks of their respective owners.

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