

Press Release

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Volvo Cars uses AI and virtual worlds with the aim to create safer cars

Volvo Cars is using AI-generated lifelike virtual worlds to enhance the development of its safety software, such as driver-assistance systems (ADAS), all with the aim of creating even safer cars.

We can now synthesise incident data collected by the advanced sensors in our new cars, such as emergency braking, sharp steering or manual intervention. This allows us to probe, reconstruct and explore them in new ways to better understand how incidents can be avoided.

This is possible thanks to an advanced computational technique called Gaussian splatting, which can create a vast amount of realistic, high-fidelity 3D scenes and subjects from real-world visuals. The virtual environment can, for example, be manipulated by adding or removing road users and changing the behaviour of traffic or obstacles on the road to generate different outcomes.

Such a technique allows us to expose our safety software to all types of traffic situations, at a speed and scale not possible before. We can now develop software that also works well in complex, rare yet potentially dangerous 'edge cases', and reduce the time it takes to expose our software to edge cases from months to days.

"We already have millions of data points of moments that never happened that we use to develop our software," says Alwin Bakkenes, Head of Global Software Engineering at Volvo Cars. "Thanks to Gaussian splatting, we can select one of the rare edge cases and explode it into thousands of new variations of the scenario to train and validate our models against. This has the potential to unlock a scale that we've never had before and even to catch edge cases before they happen in the real world."

One part of the puzzle

Volvo Cars uses virtual environments alongside real-world testing for software training, development and validation because they're safe, scalable and cost-efficient. The virtual environments are developed in-house in collaboration with Zenseact, an AI and software company founded by Volvo Cars.

This project is part of a PhD programme for leading Swedish universities to explore whether neural rendering techniques will be integrated into future safety initiatives. The study is sponsored by [Wallenberg AI, Autonomous Systems and Software Program \(WASP\)](#).

A history of using data to improve safety

Volvo Cars has a long history of using data and advanced technologies to enhance safety. Data collected by the Volvo Cars Safety Research Team has played a crucial role in the development and testing of some of the world's most prominent safety features.

In the 1970s, Volvo Cars started leveraging data to improve safety thanks to its Safety Research Team. In the early days, the team arrived at the scene of accidents with measuring tapes, assessing skid marks and other crash indicators. The data and knowledge gathered from the accidents have inspired numerous life-saving innovations, such as the Whiplash Injury Protection System and Side Impact Protection System. New advanced technology now allows us to be even smarter with how we use data to prevent risky situations.

Integration of NVIDIA technology

Volvo Cars can explore technologies such as Gaussian splatting thanks to the [recently expanded relationship with NVIDIA](#). The new generation of fully electric cars, built on NVIDIA accelerated compute, collect data from various sensors to understand what's happening in and around the car better than ever before. An AI supercomputing platform, powered by [NVIDIA DGX systems](#), contextualises this data, unlocks new insights and trains future safety models. It will improve and accelerate the development of artificial intelligence. This supercomputing platform is part of a recent investment of Volvo Cars and Zenseact to set up one of the largest data centres in the Nordics.

Want to know more?

The exploration of Gaussian splatting and generative AI forms part of Volvo Cars' presentation at the NVIDIA GTC conference. The presentation is accessible live or on demand via this [link](#).

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Volvo Cars in 2024

For the full year 2024, Volvo Car Group recorded a record-breaking core operating profit of SEK 27 billion. Revenue in 2024 amounted to an all-time high of SEK 400.2 billion, while global sales reached a record 763,389 cars.

About Volvo Car Group

Volvo Cars was founded in 1927. Today, it is one of the most well-known and respected car brands in the world with sales to customers in more than 100 countries. Volvo Cars is listed on the Nasdaq Stockholm exchange, where it is traded under the ticker "VOLCAR B".

"For life. To give people the freedom to move in a personal, sustainable and safe way." This purpose is reflected in Volvo Cars' ambition to become a fully electric car maker and in its commitment to an ongoing reduction of its carbon footprint, with the ambition to achieve net-zero greenhouse gas emissions by 2040.

As of December 2024, Volvo Cars employed approximately 42,600 full-time employees. Volvo Cars' head office, product development, marketing and administration functions are mainly located in Gothenburg, Sweden. Volvo Cars' production plants are located in Gothenburg, Ghent (Belgium), South Carolina (US), Chengdu, Daqing and Taizhou (China). The company also has R&D and design centres in Gothenburg and Shanghai (China).

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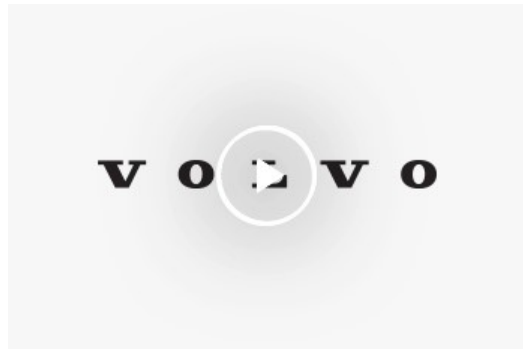
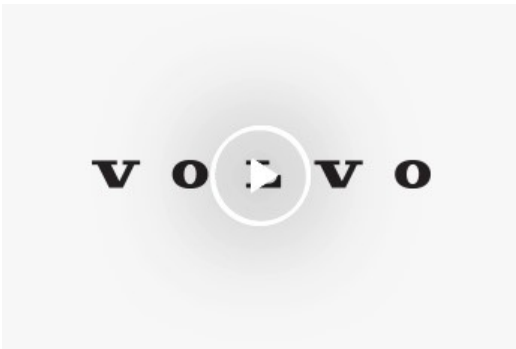
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