

Press release
May 13, 2020

BMW Group is making logistics robots faster and smarter

- Latest graphics and computing technologies for robotics applications in production logistics
- Advanced coordination capability of autonomous logistics robots
- Use of high-performance computers to stabilize processes
- Collaboration with California-based tech company NVIDIA

Munich. In future, the BMW Group will be increasing its use of high-performance computer technology, particularly artificial intelligence (AI), in logistics. Top priorities include intelligent logistics robots, data analytics and the high-definition simulation of logistics processes. These AI applications can optimize robotics and material flow, as well as take simulations in the planning process to a new level.

In a first pilot project, the BMW Group has equipped logistics robots and smart transport robots (STR) developed in-house with high-performance technology and special AI modules.

This improves the robots coordination as well as their ability to recognize people and objects compared to the technology used previously. The enhancements to the navigation system allow robots to identify obstacles such as forklifts, tigger trains and people faster and more clearly, which makes it possible to calculate alternative routes in a matter of milliseconds. This AI-based technology enables the robotics applications to learn and apply different responses to people and objects.

“The use of high-end AI and visualization technologies to redesign our logistics is revolutionary. Our collaboration with NVIDIA is allowing us to develop state-of-the-art Industry 4.0 technologies,” comments Jürgen Maidl, Head of Logistics in the BMW Group’s Production Network. “With this high-end technology, we can further optimize our logistics innovations and processes. Combining our innovations with NVIDIA’s high-performance technology is a huge step forward.”

Faster and more precise thanks to high-performance computers

The BMW Group is currently working on developing five AI-enabled logistics robots to improve logistics processes. This involves the previously announced Smart Transport Robots (STR) for autonomous transportation of materials, as well as logistics robots to select, grab and handle components and load carriers. Developed based on NVIDIA's ISAAC robotics software platform, the robots utilize a number of powerful deep neural networks (DNNs), including perception, segmentation, pose estimation and human pose estimation. In addition to real data, the robots are trained to render ray-traced machine parts in a variety of lighting and occlusion conditions. The real and synthetic data are then used to train deep neural networks on DGX servers. The robots are virtually trained and tested on the ISAAC robotics software platform, operating in Omniverse virtual environment where multiple BMW Group personnel in different geographic locations can all work in one simulated environment.

Optimized virtual logistics planning

The BMW Group already uses high-performance computer technology in conjunction with artificial intelligence in its virtual logistics planning. AI 3D scans can recognize different objects – such as containers, building structures or machines – and use this information to create a virtual layout plan through high-resolution 3D scans of entire buildings and factories. The technology allows the engineers to remove individual objects from the 3D scan using 3D planning software and then change them one at a time. This makes it easier to simulate and comprehend layout changes within the production halls.

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The BMW Group production network

In 2019, strong customer demand and new models kept capacity utilization high across the BMW Group production network. Production volumes for the BMW, MINI and Rolls-Royce brands reached record levels, with output totalling 2,564,025 units. Of those, 2,205,841 were BMW vehicles, 325,729 MINI, and 5,455 Rolls-Royce Motor Cars. Approximately one million vehicles were manufactured by the German plants.

Uniquely flexible and highly efficient, the BMW Group production network is able to respond quickly to changing markets and regional sales fluctuations. Expertise in manufacturing is a key contributor to the BMW Group's profitability.

The BMW Group production network uses a range of innovative digital and Industry 4.0 (IoT) technologies, including virtual reality, artificial intelligence and 3D printing applications. Standardized processes and structures across the production system ensure consistent premium quality and allow a high degree of customization.

The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 31 production and assembly facilities in 15 countries; the company has a global sales network in more than 140 countries.

In 2019, the BMW Group sold over 2.5 million passenger vehicles and more than 175,000 motorcycles worldwide. The profit before tax in the financial year 2019 was € 7.118 billion on revenues amounting to € 104.210 billion. As of 31 December 2019, the BMW Group had a workforce of 126,016 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company has therefore established ecological and social sustainability throughout the value chain, comprehensive product responsibility and a clear commitment to conserving resources as an integral part of its strategy.

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