Press Release
20 May 2020

BMW Group applies AI solutions to increase paint shop quality

- Ongoing algorithm-based analysis of dust content in the paint booth
- Database comparison to predict paint quality

Munich. Artificial intelligence can bring even greater precision to controlling highly sensitive systems in automotive production, as a pilot project in the paint shop of the BMW Group's Munich plant has demonstrated.

Despite state-of-the-art filtration technology, the content of finest dust particles in paint lines varies depending on the ambient air drawn in. If the dust content exceeded the threshold, the still wet paint could trap particles, thus visually impairing the painted surface.

Artificial Intelligence (AI) specialists from central planning and the Munich plant have now found a way to avoid this situation altogether. Every freshly painted car body must undergo an automatic surface inspection in the paint shop. Data gathered in these inspections are used to develop a comprehensive database for dust particle analysis. The specialists are now applying AI algorithms to compare live data from dust particle sensors in the paint booths and dryers with this database.

"Data-based solutions help us secure and further extend our stringent quality requirements to the benefit of our customers. Smart data analytics and AI serve as key decision-making aids for our team when it comes to developing process improvements. We have filed for several patents relating to this innovative dust particle analysis technology," explains Albin Dirndorfer, Senior Vice President Painted Body, Finish and Surface at the BMW Group.

Two specific examples show the benefits of this new AI solution: Where dust levels are set to rise owing to the season or during prolonged dry periods, the algorithm can detect this trend in good time and is able to determine, for example, an earlier time for filter replacement. Additional patterns can be detected where this algorithm is used alongside other analytical tools. For example, analysis could further show that the facility that uses ostrich feathers to remove dust particles from car bodies needs to be fine-tuned.

The BMW Group's AI specialists see enormous potential in dust particle analysis. Based on information from numerous sensors and data from surface inspections, the algorithm

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Press Release

Date   20 May 2020

Subject   BMW Group applies AI solutions to increase paint shop quality

Page   2

monitors over 160 features relating to the car body and is able to predict the quality of paint application very accurately. This AI solution will be suitable for application in series production when an even broader database for the algorithm has been developed. In particular, this requires additional measuring points and even more precise sensor data for the car body cleaning stations. The AI experts are confident that once the pilot project at the parent plant in Munich has been completed, it will be possible to launch dust particle analysis also at other vehicle plants.

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Artificial intelligence

The use of artificial intelligence (AI) as a key technology is an embedded element in the process of digital transformation at the BMW Group. The company already employs AI throughout the value chain, enabling it to generate added value for customers, products, employees and processes. "Project AI" is the BMW Group's centre of excellence for data analytics and machine learning. It ensures rapid connectivity plus knowledge and technology sharing throughout the company. "Project AI" therefore has a key role to play in the BMW Group's ongoing digital transformation and underpins the efficient development and scaling of new technologies. The BMW Group's D³ portfolio provides transparency on the use of technologies making Data-Driven Decisions (hence the name D³). It comprises over 400 use cases at present, more than 50 of which have already been made available for regular operation.

The BMW Group production network

Strong customer demand and the launch of new models resulted in high capacity utilization for the BMW Group's production network in 2019. With 2,564,025 vehicles produced for the BMW, MINI and Rolls-Royce brands, production volumes reached a new all-time high. This figure included 2,205,841 BMW, 352,729 MINI and 5,455 Rolls-Royce units. The company's German plants produced about one million vehicles.

The BMW Group's production system is characterized by unparalleled flexibility and a high level of efficiency, allowing for a swift response to changes in the markets and regional sales fluctuations. The BMW Group's production expertise furthermore contributes to the profitability of the company.

Press Release

Date 20 May 2020

Subject BMW Group applies AI solutions to increase paint shop quality

Page 3

In its production network, the BMW Group applies innovative technologies relating to digitalization and Industry 4.0, including virtual reality applications, artificial intelligence solutions and 3D printing. Standardized processes and structures ensure that the production system always delivers products in the same premium quality. At the same time, the BMW Group offers customers a very high level 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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