Press Release

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TÜV SÜD presents freely available machine learning life cycle

Munich. Artificial intelligence (AI) systems are becoming increasingly important in many areas of our lives. A core element of this technology is machine learning (ML). So far, the complexity of the processes underlying machine learning have proved to be a major obstacle for their use in safety-relevant areas such as healthcare or the automotive industry. Working with their partner Incenda AI GmbH, the experts from TÜV SÜD have now described a reliable ML life cycle in their whitepaper entitled "A reliable AI data labeling process" focusing on data quality and data security in the data labeling process. The dossier is now available on the Internet as a free download.

"So far, we know very little about the precise learning mechanisms of AI systems. They can draw their own conclusions and make autonomous decisions. However, we do not yet fully understand the processes behind this. Our whitepaper outlines the entire life cycle of machine learning and defines a data labeling process. In doing so, it makes an important contribution to the scientific advancement and the debate surrounding better understanding of ML processes – and thus, ultimately, higher process safety and data security. With this whitepaper, we are presenting the first freely available and reliable process in this area," says Dr. Patrick Scharpfenecker, Senior Expert Artificial Intelligence at TÜV SÜD. Automated driving is a striking example of what AI and ML are all about in practice. Ultimately, an automated or autonomous car must react correctly in the interests of road safety. The testing of these systems presents a major challenge. The whitepaper, "A reliable AI data labeling process," maps out the entire machine-learning life cycle, from specification and implementation to decommissioning of ML models.

Understanding why a car brakes

On the subject of automated driving, the electronic systems used in autonomous vehicles are increasingly dependent on AI systems for reliable management of the enormous number of road-traffic scenarios. The difficulty of developing methods that ensure the safety of systems which are based, at least in part, on artificial intelligence is obvious. AI systems draw their own conclusions from the

available data. In the training phase, they keep learning with each new road-traffic scenario, thereby continually increasing the likelihood of the vehicle responding correctly.

The whitepaper significantly contributes to our understanding of the development processes in machine learning. The key element of this research work is its examination of the iterative labeling process by which the machine learning model improves itself. This significantly reduces the efforts and costs incurred by manual data labeling. Assessment of whether the data used have resulted in good or poor development outputs is a constituent of integrated quality optimization for the approach presented in the whitepaper. Christian Pahlke, Head of Software & Systems Quality at TÜV SÜD says, "We can only intervene and ensure targeted control of machine learning if we have precise understanding of the processes behind machine learning. In other words, we not only need to know that a vehicle brakes, but also need to understand why."

Open platform for OEMs, suppliers and technology companies

The whitepaper has been developed together with TÜV SÜD's partner, Incenda AI GmbH, within the scope of the openGENESIS project. In this project, the partners investigate how AI systems learn and teach themselves, with the aim of being able to control their reactions. The core of this collaboration is the development of an open digital platform for OEMs, suppliers and technology companies.

Download link to the whitepaper:

https://wiki.eclipse.org/OpenGENESIS_WG#A_reliable_AI_data_labeling_process

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