



DIN SPEC 92001-1

Artificial Intelligence – Life Cycle Processes and Quality Requirements – Part 1: Quality Metamodel

DIN SPEC 92001-1
CASE STUDY

Ensuring AI quality

The background

Artificial intelligence (AI) describes the capability of an IT system to process information in a manner similar to humans. AI is based on neural networks and IT architectures that emulate those of the human brain. Instead of storing information unquestioningly like conventional storage elements, these networks and architectures process it autonomously and react to it. AI is one of the most significant topics of the future, impacting not only on industry and business but on other areas too, including our private sphere. But whatever the area, the quality aspect plays a central role. Unlike traditional software, the reactions of AI cannot be predicted with certainty because it acts autonomously. This needs to be taken into account over the entire AI life cycle and makes quality management of AI more difficult.

The DIN SPEC

With this in mind, DIN SPEC 92001 aims to ensure the quality of AI by means of a coherent concept, defining a quality metamodel that comprises and combines all key aspects of AI quality. Special focus is placed on the individual phases in the life cycle of AI modules, as certain quality aspects are only relevant at certain points in time. Particularly in the conception and development stages, for example, it is important to prevent bias in the processing of information. In addition, the metamodel identifies the three quality pillars that are the overarching goals of quality assurance: functionality and performance, robustness and comprehensibility. The metamodel according to DIN SPEC 92001-1 also takes into account those aspects relating to the development of an AI module that are relevant to quality. In this way the model creates the

structural basis for the specific AI quality requirements that the second part of the specification, DIN SPEC 92001-2, "Artificial Intelligence – Life Cycle Processes and Quality Requirements – Part 2: Quality Requirements", describes in greater detail.

DIN SPEC 92001 differentiates between high-risk and low-risk AI modules: Depending on where they are used, AI modules can have safety, security, privacy or ethical relevance – in this case DIN SPEC 92001-1 classes these modules as "high risk". Deviations from defined quality requirements are either permitted or require appropriate justification. In AI applications this could be the case, for example, if human life were at risk. In contrast, the recommendations for dealing with AI modules that are classed as "low risk" and that consequently have no safety, security, privacy or ethical relevance, are less stringent. Examples of these include harmless AI applications such as the automatic classification of text and images.

The benefits

DIN SPEC 92001-1 structures the typical challenges and approaches to AI module quality, providing developers and users with a clearly organized and easily understandable basis. Reflecting the fact that AI is deployed in so many areas of life, DIN SPEC 92001-1 addresses the full range of potential uses. "With the metamodel, DIN SPEC 92001-1 creates the foundation for robust, explainable, safe, secure and trustworthy AI applications," says Stephan Hinze, Managing Director of neurocat GmbH and initiator of DIN SPEC 92001-1. "When working on the content, our main concern was to describe the require-



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ments and challenges to quality assurance throughout the entire life cycle of AI modules in a transparent way.” To ensure that AI quality is maintained over the long term, further specifications based on DIN SPEC 92001-1 are planned.

The collaboration

DIN SPEC 92001-1 was developed within 8 months by the PAS procedure (PAS = Publicly Available Specification) and is available in English. The following were involved in the project: Acsioma GmbH, DFKI GmbH, Ernst & Young AG, EMEA-GSA Automation, Fraunhofer – Institut für Offene Kommunikationssysteme FOKUS, Fraunhofer-Institut für Molekularbiologie und angewandte Ökologie (IME), GESTALT Robotics GmbH, Hochschule für Angewandte Wissenschaften (HAW), Hochschule für Technik und Wirtschaft Berlin (HTW) FB4 Wirtschaftswissenschaften, Micropsi industries GmbH, Microsoft Deutschland GmbH, neurocat GmbH, Otto-von-Guericke-Universität Magdeburg, Institut III: Philosophie, Robert Bosch GmbH, Stiftung neue Verantwortung e. V., STILL GmbH, TÜV Süd Auto Service GmbH, Universität Osnabrück, Universität Tübingen. The DIN SPEC is obtainable from Beuth Verlag free of charge.

DIN SPEC 92001-1 is available for download free of charge at www.beuth.de/go/din-spec-92001-1.

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