Transforming Digital X-Ray Technology: Leveraging AI for NDT Advancements and Automation

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In this presentation, the author uses practical examples to show how various digital X-ray systems introduced through digitization pave the way for AI technology. The focus is on which foundations companies and users have to create in order to introduce AI in digital X-ray technology and which potentials lie therein. It highlights the interaction of different data systems (data acquisition software, archiving software and evaluation software) and their correspondence for the optimal use for AI technology. The talk will focus on different setups of systems highlighting advantages and disadvantages for the future use of AI. It also defines data structures and formats that are prerequisite for AI training and usage. Using various project examples from the areas of RT weld inspection, on-stream analysis, and others, the author shows real-world application examples. These examples reflect on the technological development, the implementation and business relevance for the respective partner companies and therefore paints a holistic picture of the industrial use of AI. This way the talk will describe how business cases for AI look like in NDT. Also, different levels of AI-induced automation are presented and discussed, from digital assistance systems to fully automated inspection tools. The presentation reflects on the experience gained in these specific projects and provides recommendations for action as well as the prerequisites to lead users into a digitally automated future. It addresses the hurdles of AI implementation in NDT processes, highlighting in particular the training process, the continuous adaptation of AI systems, and the current hurdles of qualification of corresponding systems. The talk closes with the status quo of AI systems qualification for NDT processes underlining best practices and current activities in standardization towards the regulation for AI inspection systems in NDT industry.