Artificial Intelligence and Machine Learning in NDT

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The increasingly complex tasks in non-destructive testing (NDT) require powerful data analytics techniques: Data have to be evaluated, relations between process parameters have to be recognized and the meaning behind data have to be interpreted. Approaches of artificial intelligence and machine learning are suitable for all of the tasks named. Together with methods of signal processing and data reduction, they provide a strong foundation to evaluate incoming data. They can be applied in applications of quality assessment, structural health monitoring and predictive maintenance. The "Machine Learning and Data Analysis" group of Fraunhofer IKTS Dresden and Chair of Communications Engineering of BTU Cottbus-Senftenberg have long-term and comprehensive research and project experiences in the field of intelligent signal processing, data analytics and visualization, and machine learning. We developed applications in various sectors such as mechanical and automotive engineering as well as paper, textile and chemical industry. Depending on inspection task, we already developed solutions for good-bad decisions, life cycle analysis or wear monitoring. Beside typical technical scopes, also some unorthodox applications like automatic analysis of pest sounds or estimation of blood sugar from voice could be processed. In this paper, we will introduce suitable approaches of artificial intelligence and present various NDT applications and results.