

Harnessing AI for Revolutionizing Nondestructive Testing and Evaluation

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This presentation explores how artificial intelligence (AI) has the potential to revolutionize Nondestructive Testing and Evaluation (NDT&E), a critical sector in ensuring the safety and integrity of engineered systems. Traditional NDT&E methods have faced limitations from a lack of human resources, time constraints, and issues with coherence. By integrating AI, there is a shift away from passive to active safety approaches, leading to increased reliability, efficiency, and predictive capabilities. AI's application in NDT&E improves accuracy by automating feature extraction, data interpretation, and providing decision support. The potential of AI-based multi-modal sensor fusion is enormous in identifying complex patterns and examining microscopic or early-stage defects. The presentation proposes a multi-modal sensor fusion AI platform that integrates data from various sensors to assess system conditions thoroughly. This platform overcomes the restrictions of individual sensor modalities and, thereby, helps detect faults that would otherwise go unnoticed. Its implementation can contribute to more adaptable NDT&E systems. The integration of artificial intelligence into NDT&E is a fundamental aspect of the NDT&E 4.0 era. To develop effective intelligent NDT&E techniques that are suitable for field use, it is necessary to share data and construct a foundation model based on a large amount of NDT data acquired from actual inspections, experiments, and simulations.