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(57) Abstract :

An apparatus for artificial intelligence driven automated defect detection in industrial imaging and a method thereof are disclosed. The apparatus comprises a physically mountable inspection device including an imaging acquisition unit configured to capture image data of industrial components or surfaces, an image preprocessing unit configured to normalize and enhance the captured image data, a central processing unit configured to execute artificial intelligence based inference to identify, classify, and localize defects, and a defect decision unit configured to determine defect validity and severity relative to predefined acceptance criteria. A communication interface transmits structured defect detection data to industrial control systems or operator interfaces for automated quality control actions. The method includes acquiring industrial image data, preprocessing the data, performing artificial intelligence driven defect analysis, and generating actionable defect outputs in real time. The invention enables adaptive, low-latency, and reliable defect detection directly integrated with industrial machines and structures.

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