



Industrial Consultancy & Sponsored Research (IC&SR)

METHOD AND SYSTEM FOR GENERATING TIME-EFFICIENT SYNTHETIC NON-DESTRUCTIVE TESTING DATA

IITM Technology Available for Licensing

Problem Statement

- Non-destructive testing (NDT) is the process of inspecting, testing or evaluating materials components or assemblies for characteristics differences or **welding defects, discontinuities** etc. without causing damage to the serviceability of such material components or assemblies.
- The technical problem underlying the invention is stated that "how to provide accurate detection and classification of defects in NDT/NDE."
- Present Invention provides the technical solution to the technical problem of the existing **NDT method** by integrating the artificial intelligence **(AI) automation system** for generating a large volume of NDT datasets.

Technology Category/ Market

AI based NDT datasets generating method and System

Application: Automated Defect Recognition (ADR) System; **Software** for automated Defect Recognition, Visual/Surface/volumetric Inspection;

Market: The **NDT testing software** market is expected to reach **\$853.7 million** by **2026**, registering expansion at a **CAGR** of **11.1%**;

Technology

- Present invention describes an AI based time efficient method and system for generating synthetic non-destructive training datasets.
- The system determines a CAD model representing the actual physical defect sample based on the received geometrical features, further including critical statistical distribution parameters, and generates a synthetic NDT datasets based on training the AI model.

- The method comprises a few steps depicted in the figures. A smart chart shows herein below:



Receiving real time experimental NDT datasets by the processor; & Performing numerical analysis on said dataset by using numerical solution model;



Training a deep convolutional generative adversarial network(DCGAN) by using the generated NDT datasets with flaw geometrical features;



Receiving random number input vectors iteratively at the trained DCGAN; & Generating a synthetic NDT datasets for each of the received said input vector by the trained DCGAN.

Key Features / Value Proposition

❖ Technical Perspective:

Present system provides **AI driven NDT datasets**, wherein the testing dataset includes **dimensions** of defective samples, **expected defect morphologies**, **defect probabilities**, the **sensitivity of instruments**, **observation from experimental datasets**, and **noise from instrumentation**.

❖ Industrial Perspective:

1. Claimed system facilitates an **automated, robust, highly scalable, time efficient platform to generate a large volume** of synthetic NDT datasets.
2. The system **reduces computational resources** and **time** by a **factor of N/n**.

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Images

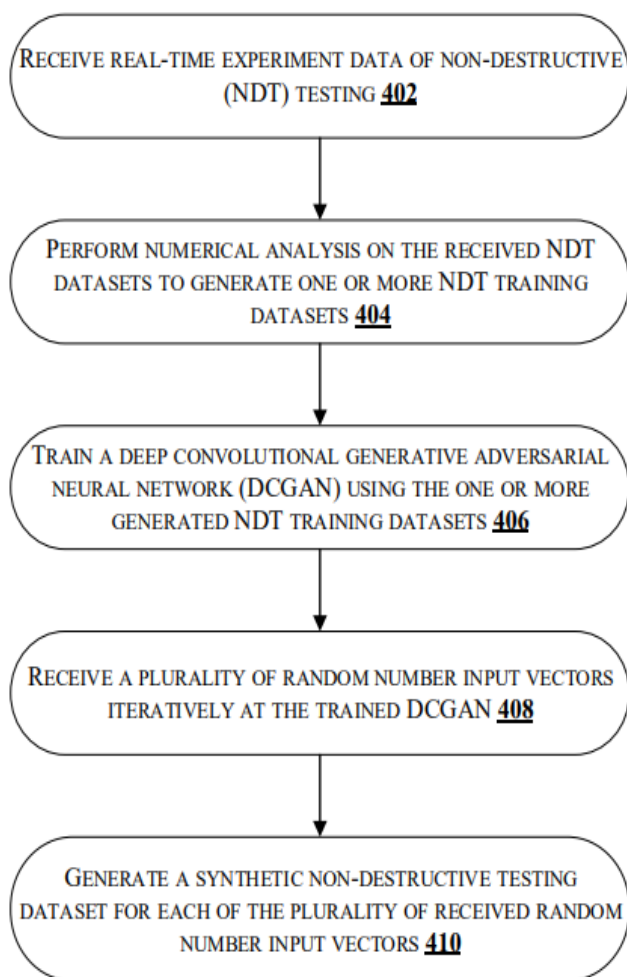


Fig. 1: Illustrate Flowchart showing a method for generating synthetic NDT datasets

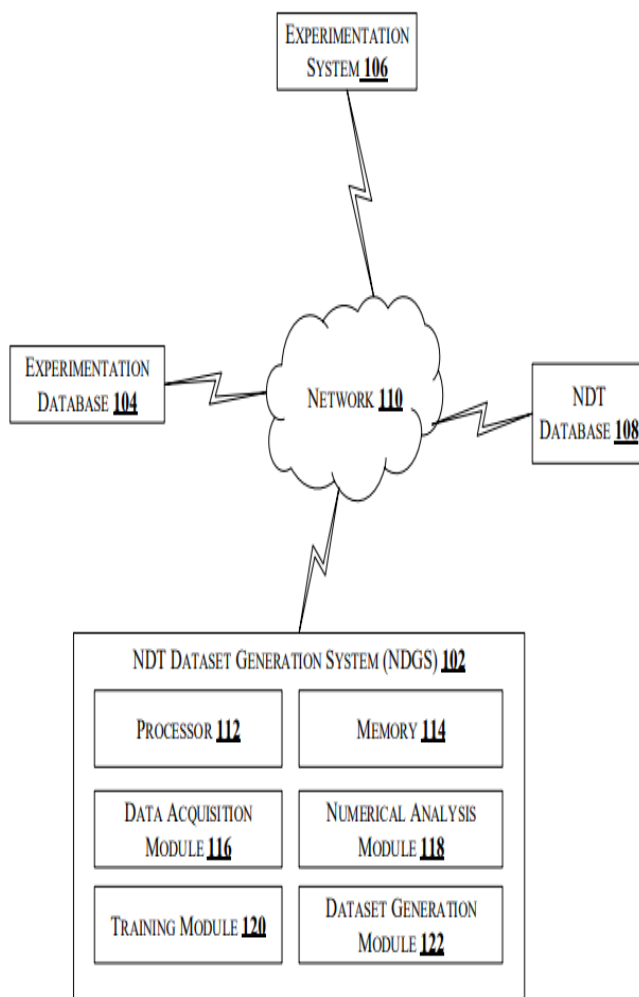


Fig. 2: Illustrates a system to generate synthetic NDT datasets

TRL (Technology Readiness Level)

TRL- 3/4, Proof of Concept Ready Stage & validated

Research Lab

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Intellectual Property

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