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Author : Damien Segur – CEA List

Co-Authors : Damien Segur (CEA List) | Xavier Artusi (CEA List) | Pierre Calmon (CEA List) | Silvère Barut (Airbus)

TITLE : DEVELOPMENT OF DEDICATED CLASSIFICATION TOOLS FOR THE AUTOMATED DIAGNOSTIC FROM NON-DESTRUCTIVE TESTING DATA

ABSTRACTS

An important problematic in the field of non-destructive testing is the management of large datasets of inspection data and their efficient exploitation to monitor the life of various structures and components. A collaboration between CEA LIST and Airbus has led to the development of dedicated classification algorithms. The application case proposed by Airbus was addressed in the context of the CORAC [1] project INNOFAB. Airbus group collects, with its software NDTKIT [2], data coming from inspections of airfoil stiffeners made of composite material. These experimental databases contain quantitative indicators extracted from ultrasonic testing signals and a set of tags affected to the measurement by technical experts, in particular the category of damage. The volume of inspection of those structures is typically 60 per year, each one being equipped with 18 stiffeners. An unsupervised classifier has been designed and trained to attribute to input data a class of damage among a set of four classes (layer porosity, volume porosity, gap between tows and irrelevant indications). Specific treatments applied to the database, like dimensionality reduction and handling of over/under-representation of classes will be described, as well as results obtained in terms of performance on experimental datasets. In terms of perspectives, this work demonstrates the potential of learning by example techniques to assist the experts and provide automated diagnostic.

KEYWORDS

Classification | Database | Dimension Reduction | Machine learning |