Fused empirical mode decomposition and wavelets for locating combined damage in a truss-type structure through vibration analysis

基于融合经验模式分解和小波分析方法的桁架式结构损伤定位的振动分析

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- The paper presents a fused methodology of Wavelet packet transform and Empirical mode decomposition methods, combined with artificial neural networks , for the identification and location of combined damage in a truss-type structure.

- The structure used in the case of study has five bays and was excited with an electrodynamic shaker. The proposed methodology is able to automatically locate and identify damage such as loosened bolts, reduced stiffness, internal corrosion, and their combinations in an automated monitoring process.

- The proposed methodology provides an easy way to locate and identify multiple-combined damage. It can be regarded as a simple and effective tool without sophisticated analysis, toward establishing a practical, reliable and more general SHM methodology. In addition, the results show that the proposed methodology could be applied to detect and locate damage in others structures by analyzing the fusion of energies, which will help to improve the performance, resistance, design, and life service of real structures.

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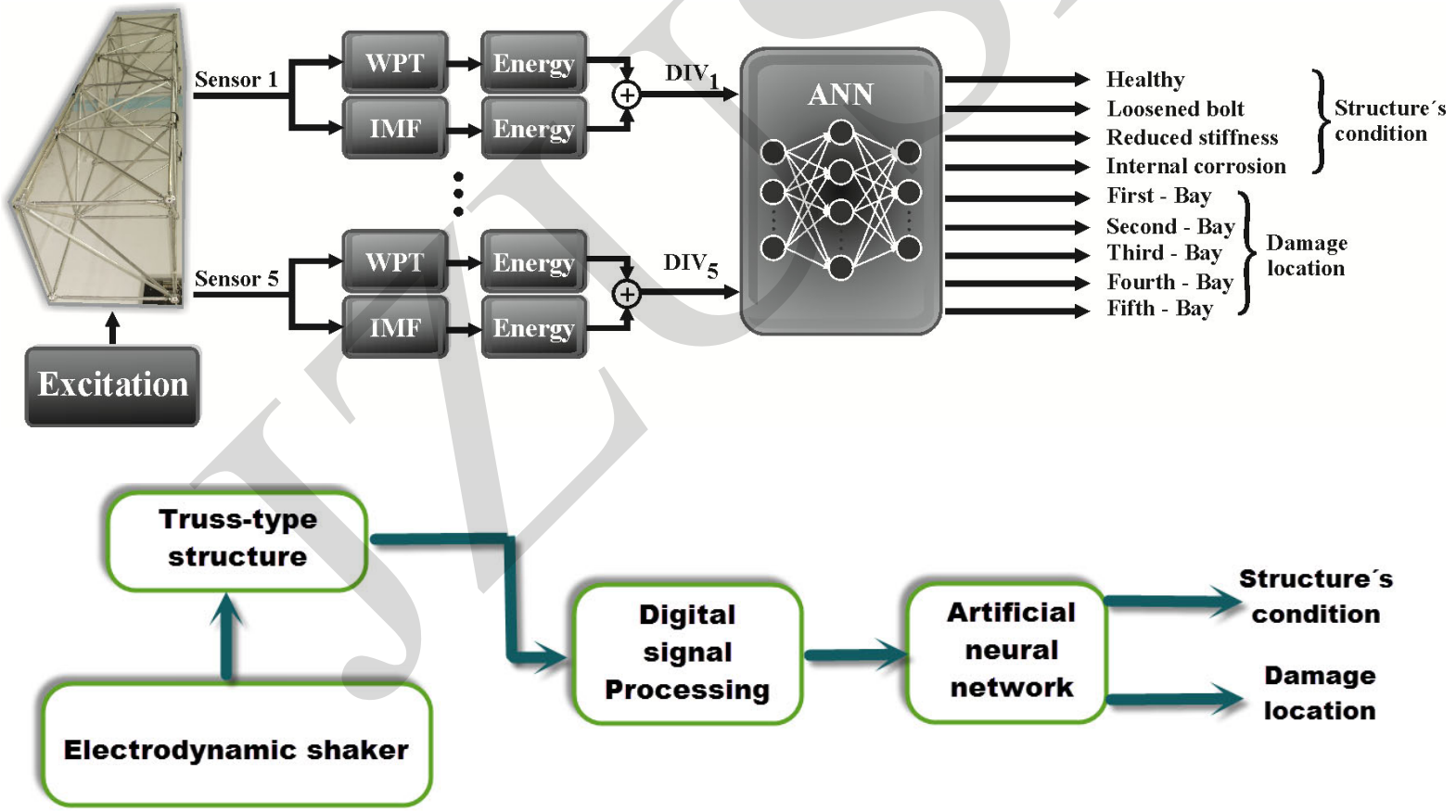
- This paper presents a fusion of vibration data and methodologies (EMD, WPT and ANN) used to locate and identify damage in an automated monitoring process.

Diagram flow of the applied process for detection-location of different damage conditions:



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