عنوان مقاله:

Automatic Damage Detection in Concrete Gravity Dams Using Vibration Signal Time-Frequency Features and the Support Vector Classifier

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خلاصه مقاله:

In dam engineering, damage detection in concrete gravity dams (CGDS) is a practical problem. Dam destruction can have severe financial consequences and may even cause casualties. Therefore, damage detection in advance is absolutely crucial. The main objective of this study is the automatic detection of health or destruction of concrete gravity dams after applying vibration to them. To be more precise, %0 of destruction is categorized as normal and any percentage of destruction is regarded as damaged. In this regard, a well-known CGD, namely the Pine Flat Dam, has been chosen for the Finite Element modeling. The damage will be induced in the dam neck by elasticity modulus reduction by %40 and %80. This article has also used the processing of signal of the structure vibration in time domains with the help of classical linear and statistical features, time-frequency domain features with recourse to the wavelet method, extraction of statistical features in different levels and non-linear features, such as Shannon entropy. The most suitable features will be chosen after extracting them by the T-test. In the end, the support vector machines (SVM), linear discrimination analysis (LDA) and multi-layer perceptron (MLP) are used to find the most accurate diagnosis.

کلمات کلیدی:

Damage Detection, Concrete Gravity Dams, Signal Processing, Support Vector Machine, Multilayer Perceptron

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