

عنوان مقاله:

A case study for application of fuzzy inference and data mining in structural health monitoring

محل انتشار:

مجله هوش مصنوعی و داده کاوی، دوره 6، شماره 1 (سال: 1397)

تعداد صفحات اصل مقاله: 16

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خلاصه مقاله:

In this study, a system for monitoring the structural health of bridge deck and predicting various possible damages to this section was designed based on measuring the temperature and humidity with the use of wireless sensor networks, and then it was implemented and investigated. A scaled model of a conventional medium sized bridge (length of 50 meters, height of 10 meters, and with 2 piers) was examined for the purpose of this study. This method includes installing two sensor nodes with the ability of measuring temperature and humidity on both side of the bridge deck. The data collected by the system including temperature and humidity values are received by a LABVIEW-based software to be analyzed and stored in a database. Proposed SHM monitoring system is equipped by a novel method of using data mining techniques on the database of climatic conditions of past few years related to the location of the bridge to predict the occurrence and severity of future damages. In addition, this system has several alarm levels which are based on analysis of bridge conditions with fuzzy inference method, so it can issue proactive and precise warnings and alarms in terms of place of occurrence and severity of possible damages in the bridge deck to ensure total productive (TPM) and proactive maintenance. Very low costs, increased efficiency of the bridge service, and reduced maintenance costs makes this SHM system a practical and applicable system. The data and results related to all mentioned subjects were thoroughly discussed.

کلمات کلیدی:

fuzzy logic, data mining, fuzzy inference techniques

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<https://civilica.com/doc/894111>

