An Improved Unsupervised Novelty Detection Method Using Deep Auto-Encoders For Real-Time Assessing Operation Conditions Of Overpasses

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The collapse of urban overpasses caused by vehicle overload, immaturity design theory and deficiency of construction quality occasionally happened in recent years worldwide. Thus, developing an effective and efficient platform of data analysis to timely monitor the health conditions of overpasses being in service is highly needed. An intelligent structural health monitoring system based on an improved unsupervised novelty detection method using deep auto-encoders is developed in this study to analyze the monitoring data from a section of overpass after reinforcement in Suzhou, China. The ongoing projects for data acquisition are mainly focus on collecting the data of overpass during operation, such as the settlement and tilt of piers, the deformation and vibration of girders. Through timely processing and analysis of these monitoring data, the abnormal operation status of overpass can be obtained in real-time, and online monitoring in the long-term operation stage can be realized.