عنوان مقاله:

Machine Learning Approach for Structural Health Monitoring and Damage Detection

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خلاصه مقاله:

Structural Health Monitoring (SHM) is a critical aspect of ensuring the safety and longevity of civil infrastructure. Traditional methods have limitations in providing real-time insights into structural conditions, leading to a demand for more advanced solutions. This article explores the application of machine learning in SHM for efficient and accurate damage detection. The process encompasses data acquisition from various sensors, feature extraction, data preprocessing, and model selection. Supervised and unsupervised learning algorithms, such as Support Vector Machines, Random Forests, and neural networks, are considered for training and validation. The trained models are then deployed for real-time damage detection, offering the potential for early intervention and proactive maintenance. Continuous monitoring and adaptation ensure the system's resilience to changing conditions, while the integration of human expertise remains pivotal for interpreting results. This holistic approach to SHM, empowered by machine learning, holds promise for revolutionizing how we monitor and manage the structural integrity of our built environment, paving the way for safer and more sustainable infrastructure.

کلمات کلیدی:

Structural Health Monitoring; Machine Learning; Damage Detection; Civil Infrastructure; Maintenance Costs.

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