ASSESSING THE STRUCTURAL HEALTH OF BUILDINGS USING SMARTPHONES AND AMBIENT VIBRATION

Tech ID: 34618 / UC Case 2026-110-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Monitoring the structural integrity of buildings traditionally requires expensive, specialized sensor networks that are difficult to deploy at scale. UC Berkeley researchers have developed a novel approach that leverages the existing network of smartphones equipped with the MyShake earthquake early warning application. By utilizing the highly sensitive accelerometers within millions of consumer devices, the system measures the natural frequencies and damping ratios of buildings through ambient vibrations. This crowdsourced data provides a real-time, large-scale assessment of structural health across entire urban environments. The platform effectively transforms everyday mobile devices into a distributed seismic monitoring array, allowing for continuous observation of building performance without the need for dedicated hardware installations.

SUGGESTED USES

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Post-Earthquake Safety Assessment: Rapidly identifying buildings that have undergone significant changes in structural response after a seismic event.

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Long-Term Structural Aging Studies: Monitoring the gradual shift in a building's natural frequency over years to detect structural fatigue or degradation.

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Urban Infrastructure Management: Providing city planners and engineers with a map of structural vulnerabilities across a metropolitan area.

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Insurance Risk Modeling: Enhancing seismic risk assessments for insurers by incorporating real-time building performance data.

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Construction Site Monitoring: Assessing how nearby construction or excavation affects the vibration characteristics and health of adjacent structures.

ADVANTAGES

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Extreme Scalability: Leverages billions of existing smartphones, enabling city-wide or global monitoring without additional infrastructure costs.

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High Spatial Density: Provides dense data points within individual buildings and across urban blocks that traditional sensor networks cannot match.

CONTACT

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INVENTORS

» Allen, Richard M.

OTHER INFORMATION

CATEGORIZED AS

» **Computer**

» Software

» **Engineering**

» Engineering

» **Sensors & Instrumentation**

» Physical Measurement

» Scientific/Research

RELATED CASES

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Cost-Effective: Eliminates the requirement for expensive, permanent seismic sensors and the labor-intensive process of manual installation.

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Real-Time Insights: Offers continuous data collection and analysis, allowing for immediate detection of structural changes following seismic triggers.

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Passive Sensing Mechanism: Operates in the background using ambient vibrations (wind, traffic, and human activity), requiring no active interference with the building or its occupants.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- MyShake: Earth Quake Early Warning System Based on Smartphones
- Monitoring Building Structural Health Using Smartphones And Ambient Vibrations

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