GPR attribute analysis for tree trunk assessment: An advanced imaging approach.

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Abstract

For non-destructive subsurface imaging in a variety of geophysical and civil engineering applications, ground penetrating rad (GPR) has proven to be an effective technique. The use of sophisticated GPR attribute analysis for tree trunk structural healt monitoring is investigated in this work. We evaluate internal anomalies, decay, and structural integrity in tree trunks using attribute-based imaging approaches. To improve the visualisation and interpretation of subsurface structures within tree tru key GPR textural attributes are analysed, such as Contrast, Energy, Homogeneity, Dissimilarity, and Entropy. Numerical simulations and experimental GPR scans are used to validate the concept, showing how well attribute analysis works to det internal defects. Overlays and RGB mixed models are utilised to display composite displays of textural features and multiple properties.

To better visualise internal reflection patterns, several GPR attributes are characterised using a multi-attribute comparative analysis. The results demonstrate GPR's potential as a non-invasive diagnostic method for tree trunk health monitoring rese which could enhance tree health evaluation and urban forestry management

Keywords

GPR attribute analysis, Tree trunks