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WALLEYE: Advanced Wall Crack Detection System

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Abstract: *Wall crack detection is important for checking the safety and condition of buildings. Cracks in walls can become dangerous if they are not identified at an early stage. This paper presents a machine learning–based system that automatically detects wall cracks using images and photographs. By using deep learning and computer vision techniques, the system finds cracks on wall surfaces and measures crack features such as length and width.*

Based on the crack size, the system classifies cracks as minor, moderate, or major. Minor cracks usually occur due to plaster shrinkage and have low risk, while major cracks indicate serious structural problems. The system also determines the risk level of cracks as low, medium, or high and suggests suitable repair solutions. Minor cracks can be repaired using simple fillers, whereas major cracks require expert inspection.

A Python-based risk level graph is used to clearly show the relation between crack width and risk level. The results show that the proposed system provides accurate crack detection and reduces the need for manual inspection. Overall, this system is reliable, time-saving, and helpful for improving building safety and maintenance planning..

Keywords: Wall Crack Detection, Machine Learning, Deep Learning, Computer Vision, Risk Analysis

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