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Design of an Enhanced Defect Identification System for Commercial Building Construction

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Abstract: Fairfax County, Virginia has the second-largest suburban commercial real-estate market in the United States and has been experiencing steady growth in recent years. To ensure that commercial buildings are constructed according to the state building code and approved building specifications, manual inspections using human vision are conducted throughout construction. With risks of falling and inadequate measurement methods, identifying defects of the building exterior poses various safety, accuracy, and efficiency challenges for inspectors observing defects out of visual line of sight. A stochastic simulation model was developed using distributions derived from time and motion field studies to compare the safety, accuracy, and elapsed time of three design alternatives to collect, process, and analyze the inspection data. The alternatives are the manual use of Automated Defect Identification and Aerial-based Automated Defect Identification using image recognition with a utility improvement of 10% and 30%, respectively, compared to that of the Human Vision inspection.

Keywords: aerial inspection, building code, construction inspection, image recognition