Advanced Building Management Framework Based on AI Analytics

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SUMMARY

Rapid urban expansion and the relaxation of development restriction zones in Korea since the 2000s have accelerated construction activities in both urban and suburban areas. However, these changes have also led to a significant increase in unauthorized and illegal buildings, creating challenges in urban management, spatial planning, and public safety. Conventional monitoring approaches—such as field inspections, citizen reports, and satellite imagery—are limited in spatial coverage, temporal frequency, and cost-efficiency, making it difficult for local governments to maintain accurate and up-to-date building information.

This study proposes an AI-driven framework for advanced building management based on drone imagery and spatial data integration. The approach leverages deep learning-based image analysis to detect unauthorized constructions, illegal extensions, and deteriorated structures by comparing aerial observations with existing building registry and cadastral information. Automated feature extraction and change detection techniques enable efficient identification of discrepancies between registered and actual building conditions.

The proposed method strengthens administrative capabilities by enabling real-time monitoring, reducing human dependency, and improving spatial data accuracy. Furthermore, it provides a scalable solution for local governments to enhance regulatory compliance and optimize maintenance planning. This research contributes to the development of an intelligent, data-driven building management system that supports sustainable urban governance and efficient spatial information utilization.