Semantic Segmentation and Change Detection of 3D Buildings Based on Feature Metric Learning

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SUMMARY

Accurate semantic segmentation and automated change detection of 3D buildings are core challenges in the dynamic updating of 3D urban scenes. Traditional methods often rely on manual interpretation or single data sources, resulting in low efficiency and limited scalability for large-scale applications. This paper proposes a novel approach based on visual and geometric feature metric learning. Building upon a semantic segmentation model for 3D scenes and incorporating 3D Gaussian representations, our method identifies significant discrepancies in the feature space by measuring the similarity between each primitive and building prototype features in an embedded space. This enables the detection of building changes such as additions, demolitions, and modifications. The proposed approach provides a reliable technical pathway for large-scale, automated, and high-precision intelligent processing and dynamic updating of 3D urban scene data.