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Multiresolution representation of oblique airborne photogrammetry-based 3D city models in Digital Earth

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ABSTRACT:

Oblique airborne photogrammetry (OAP) is a highly cost-effective and yet practicable approach to 3D city reconstruction, especially when a light-weight unmanned aerial vehicle (UAV) is employed. The diversified geometrical and textural information from OAP city models have great potential for enriching the geographic context of a Digital Earth (DE) system, but the big data volume makes it hard to interactively explore such models in full details. The traditional level-of-detail (LOD) terrain representations do not accommodate full-3D textured meshes, which are fundamental to the representation of OAP city models. In this paper, we investigate the algorithms and techniques which may potentially be employed to construct an efficient multiresolution representation of OAP city models, including such aspects into account as space partitioning, mesh simplification, data compression and rendering performance. We also explore the possibility of developing a semantic database for object-based classification and identification of OAP city models, as well as for storage and retrieval of the object-related attribute information.

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