Classified and Clustered Data Constellation: An Efficient Approach of 3D Urban Data Management - DTU Orbit (08/11/2017)

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The growth of urban areas has resulted in massive urban datasets and difficulties handling and managing issues related to urban areas. Huge and massive datasets can degrade data retrieval and information analysis performance. In addition, the urban environment is very difficult to manage because it involves various types of data, such as multiple types of zoning themes in the case of urban mixed-use development. Thus, a special technique for efficient handling and management of urban data is necessary. This paper proposes a structure called Classified and Clustered Data Constellation (CCDC) for urban data management. CCDC operates on the basis of two filters: classification and clustering. To boost up the performance of information retrieval, CCDC offers a minimal percentage of overlap among nodes and coverage area to avoid repetitive data entry and multipath query. The results of tests conducted on several urban mixed-use development datasets using CCDC verify that it efficiently retrieves their semantic and spatial information. Further, comparisons conducted between CCDC and existing clustering and data constellation techniques, from the aspect of preservation of minimal overlap and coverage, confirm that the proposed structure is capable of preserving the minimum overlap and coverage area among nodes. Our overall results indicate that CCDC is efficient in handling and managing urban data, especially urban mixed-use development applications.

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