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Semi-Automatic Objects Recognition in Urban Areas Based on Fuzzy Logic

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ABSTRACT

Three dimensional object extraction and recognition (OER) from geographic data has been definitely one of more important topic in photogrammetry for quite a long time. Today, the capability of rapid generating high-density DSM increases the supply of geographic information but the discrete nature of the measuring makes more difficult to recognize correctly and to extract 3D objects from these surface. The proposed methodology wants to semi-automate some geographic objects clustering operations, in order to perform the recognition process. The clustering is a subjective process; the same set of data items often needs to be partitioned differently based on the application. Fuzzy logic gives the possibility to use in a mathematical process the uncertain information typical of human reasoning. The concept at the base of our proposal is to use the information contained in Image Matching or LiDAR DSM, and typically understood by the human operator, in a fuzzy recognition process able to combine the different input in order to perform the classification. So the object recognition approach proposed in our workflow integrates 3D structural descriptive components of objects, extracted from DSM, into a fuzzy reasoning process in order to exploit more fully all available information, which can contribute to the extraction and recognition process and, to handling the object ' s vagueness. The recognition algorithm has been tested with to different data set and different objectives. An important issue is to apply the typical human process which allows to recognize objects in a range image in a fuzzy reasoning process. The investigations presented here have given a first demonstration of the capability of this approach.

KEYWORDS

Objects Recognition, DSM, Fuzzy Logic

Cite this paper

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