

RANGE IMAGE SEGMENTATION AND OBJECT RECOGNITION USING MARKOV RANDOM FIELD MODEL

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ABSTRACT

The problem of remote sensing and automatic object recognition using three-dimensional range data is considered. It is assumed that range image is obtained by a laser radar which determines the distance from the sensor to the object in every pixel. Each object to be recognized is a solid of arbitrary shape and composed with a small number of primitive surfaces. The sensed range image is then divided into homogenous regions which approximate different objects surfaces. The range image digital processing is based on a two-level hierarchical Markov random field model and sequential segmentation of the range data within a formal statistical estimation framework. It is shown that the range image segmentation algorithm proposed can be realised in the systolic array processor. Theoretical and experimental characteristics of proposed segmentation algorithm are given with discussion of practical applications.