DEPTH SENSOR BASED OBJECT DETECTION USING SURFACE CURVATURE

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ABSTRACT

An object detection system finds objects from an image or video sequence of the real world. The good performance of object detection has been largely driven by the development of well-established robust feature sets. By using conventional color images as input, researchers have achieved major success. Recent dramatic advances in depth imaging technology triggered significant attention to revisit object detection problems using depth images as input.

Using depth information, we propose a feature, Histogram of Oriented Curvature (HOC), designed specifically to capture local surface shape for object detection with depth sensor. We form the HOC feature as a concatenation of the local histograms of Gaussian curvature and mean curvature. The linear Support Vector Machine (SVM) is employed for the object detection task in this work. We evaluate our proposed HOC feature on two widely used datasets and compare the results with other well-known object detection methods applied on both RGB images and depth images. Our experimental results show that the proposed HOC feature generally outperform the HOG and HOGD features in object detection task, and can achieve similar or higher results compared with the state-of-the-art depth descriptor HONV on some object categories.