3D object recognition using 2D moments and HMLP network

Abstract

This paper proposes a method for recognition and classification of 3D objects using 2D moments and HMLP network. The 2D moments are calculated based on 2D intensity images taken from multiple cameras that have been arranged using multiple views technique. 2D moments are commonly used for 2D pattern recognition. However, the current study proves that with some adaptation to multiple views technique, 2D moments are sufficient to model 3D objects. In addition, the simplicity of 2D moment's calculation reduces the processing time for feature extraction, thus decreases the recognition time. The 2D moments were then fed into a neural network for classification of the 3D objects. In the current study, hybrid multi-layered perceptron (HMLP) network is proposed to perform the classification. Two distinct groups of objects that are polyhedral and free-form objects were used to access the performance of the proposed method. The recognition results show that the proposed method has successfully classified the 3D object with the accuracy of up to 100%.

Keywords — Hybrid multi-layered perceptrons (HMLP), processing time, recognition rate, shape information