3D Object Recognition Using MANFIS Network With Orthogonal And Non-Orthogonal Moments

Abstract

This paper addresses a performance analysis of two well known moments, namely Hu's moments and Zernike's moments for 3D object recognition. Hu's moments and Zernike's moments are the non-orthogonal and orthogonal moments respectively, which are commonly used as shape feature for 2D object or pattern recognition. The current study proved that with some adaptation to multiple views technique, Hu and Zernike moments are sufficient to model 3D objects. In addition, the simplicity of moments calculation reduces the processing time for feature extraction, hence increases the system efficiency. In the recognition stage, we proposed to use a neuro-fuzzy classifier called multiple adaptive network based fuzzy inference system (MANFIS) for matching and classification. The proposed method has been tested using two groups of object, polyhedral and free-form objects. The experimental results show that Zernike moments combined with MANFIS network attain the best performance in both recognitions, polyhedral and free-form objects.

Subject Keywords

Zernike polynomials
Computer vision
Feature extraction
Fuzzy control
Object recognition
MANFIS network