

## **3D object recognition system using multiple views and cascaded multilayered perceptron network**

### **Abstract**

This paper proposes an effective method for recognition and classification of 3D objects using multiple views technique and neural networks system. In the processing stage, we propose to use 2D moment invariants as the features for modeling 3D objects. 2D moments have been commonly used for 2D object recognition. However, we have proved that with some adaptation to multiple views technique, 2D moments are sufficient to model 3D objects. In addition, the simplicity of 2D moments calculation reduces the processing time for feature extraction, hence increases the system efficiency. In the recognition stage, we propose a cascaded multilayered perceptron (c-MLP) network for matching and classification. The c-MLP contains two MLP networks which are arranged in a serial combination. This proposed method has been tested using two groups of object, polyhedral and free-form objects. We also compare our method with standard MLP network. Our results show that the proposed method can successfully be applied to 3D object recognition. In addition, the proposed network also achieved better performance and faster convergence rate compared to the than standard MLP.

**Keywords** — Object recognition, cascade multilayered perceptron (c-MLP), three dimensional (3d) object recognition systems, vision systems