

## Scene Classification Using Hierarchy Neural Network, Directed Acyclic Graph Structure, and Label Relations

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**Abstract :** A more accurate scene classification algorithm using label relations and the hierarchy neural network was developed in this work. In many classification algorithms, it is assumed that the labels are mutually exclusive. This assumption is true in some specific problems, however, for scene classification, the assumption is not reasonable. Because there are a variety of objects with a photo image, it is more practical to assign multiple labels for an image. In this paper, two label relations, which are exclusive relation and hierarchical relation, were adopted in the classification process to achieve more accurate multiple label classification results. Moreover, the hierarchy neural network (hierarchy NN) is applied to classify the image and the directed acyclic graph structure is used for predicting a more reasonable result which obey exclusive and hierarchical relations. Simulations show that, with these techniques, a much more accurate scene classification result can be achieved.

**Keywords :** convolutional neural network, label relation, hierarchy neural network, scene classification

**Conference Title :** ICICSP 2017 : International Conference on Information, Communications and Signal Processing

**Conference Location :** Singapore, SG

**Conference Dates :** March 29-30, 2017