

# Fuzzification of neural network pattern outputs for classification problems

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## Abstract

Convolutional neural network algorithms are efficient machine learning tools for classification problems. Their performance can be affected by the quality of the train data. One usual problem is that the train data has crisp output values even in cases when the train patterns could belong to multiple classes at some fuzzy level. In this paper simple methods are defined which can be used to modify the train patterns during the training process to get fuzzy output values from the crisp values of the train data set. This fuzzification is done so that the knowledge gained will be tried to be used to correct the imprecise output class values of the train patterns. The performance of the algorithm variations has been analyzed and shown in the research material.

*Keywords:* neural network, convolutional neural network, classification, fuzzification.