

# Fuzzy Integral and Its Applications to Classification

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## Abstract

Fuzzy integral is a type of non-linear functional dependent on fuzzy measures for which there has been much investigation from a mathematical perspective. This lecture will focus on the fuzzy measure defined on a finite universe and questions such as mathematical convergence of a fuzzy integral will not be addressed. We would like to show how to effectively compute a fuzzy integral defined on finite universe, and why do we need new type of fuzzy integrals although many fuzzy integral forms have been proposed. Two applications of fuzzy integrals will be presented: (1) Fuzzy integral can be regarded as a new type classifier having the capability of representing the interaction among the attributes, and (2) Fuzzy integral can be considered as a good tool to combine different classifiers (same or different types), with the combined output expected to have a significant improvement compared with the individual ones. We will also discuss the problems of building a fuzzy integral classifier and the fusion of multiple classifiers, which are shown to be closely related to the determination of a fuzzy measure.