

Introduction to Statistical Pattern Recognition and Its Applications

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Pattern recognition is the categorization and classification of specific patterns based on predefined characteristics from sets of available data. Implementation of many human skills such as face recognition, speech recognition, reading handwritten letters with very high stability to noise and different environmental conditions (like what exists in humans) by machines is one of the problems and issues that have been the focus of researchers in various engineering fields such as artificial intelligence and machine vision in the last few decades. Pattern recognition has many applications in various fields of science, including electrical engineering (medicine, computer and telecommunications), biology, machine vision, economics and psychology. Among the applications, we can mention things such as: recognition of voice, face, handwriting, fingerprint and signature, automatic disease detection from medical data (signal or image), detection of DNA strands, industrial automation and remote sensing. Pattern recognition, in short, deals with the problem of clustering and classification supervised and unsupervised and includes a wide range of statistical classical methods, intelligent algorithms, neural networks and fuzzy logic. In this regard, I recommend the book "Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron, Second Edition.