

About the Use of Graphs in Pattern Recognition

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Abstract

The talk presents an overview of how graphs have been used in Pattern Recognition ; their use is strongly suggested in all those cases in which the objects of interest are represented by means of parts suitably connected with each other, so as to arrive to a description in terms of a relational graph. The overview is aimed at reveal the rationale inspiring the papers published in these years, so as to roughly classify them. Despite the extent of scientific production in this field, it is possible to identify three historical periods, each having its own connotation common to most of the corresponding papers, which are called here as the pure, the impure and extreme periods. The use of a graph-based pattern representation induces the need to formulate the main operations required in Pattern Recognition in terms of operations on graphs : classification, usually intended as the comparison between an object and a set of prototypes, and learning, which is the process for obtaining a model of a class starting from a set of known samples, are among the key issues that must be addressed using graph-based techniques. Starting from the way in which these basic operations are defined and carried out it is possible to identify the above mentioned periods and the talk is focused on the most relevant techniques proposed along these years, so as to give the audience an overview of the field.

Bio

Mario Vento est membre fellow de l'International Association for Pattern Recognition (IAPR). Il est actuellement professeur d'informatique et d'intelligence artificielle à l'université de Salerne (Italy), où il dirige l'Artificial Vision Lab. De 2002 à 2006 il a été président de l'IAPR Technical Committee TC15 sur "Graph Based Representation in Pattern Recognition", et depuis 2003 éditeur associé de "Electronic Letters on Computer Vision and Image Analysis". Ses recherches s'inscrivent dans les domaines de l'intelligence artificielle, l'analyse d'image, la reconnaissance de formes, l'apprentissage automatique et la vision par ordinateur. Plus précisément ses travaux portent sur l'analyse et l'interprétation de vidéos en temps réel pour des applications de surveillance de la circulation et de vidéosurveillance, sur les méthodes de classification statistiques, syntaxiques ou structurelles, sur la mise en correspondance exacte et inexacte de graphes, sur la classification multi-expert et les méthodes d'apprentissage pour des descriptions structurelles. Il est l'auteur de plus de 170 publications dans des journaux internationaux et conférences internationales.