

# Preface

The present book is concerned with the use of graphs in the field of structural pattern recognition. In fact, graphs are recognized as versatile alternative to feature vectors and thus, they found widespread application in pattern recognition and related fields (yet, the present book is actually focused on the field of pattern recognition only). In the last four decades, a huge number of procedures for graph distance computation, which is actually a basic requirement for pattern recognition, have been proposed in the literature. *Graph edit distance*, introduced about 30 years ago, is still one of the most flexible graph distance models available and subject of various recent research activities.

The objective of the present book is twofold. First, it gives a general and thorough introduction into the field of structural pattern recognition with a particular focus on graph edit distance (including a survey of graph edit distance applications that emerged during the last decade). Second, it presents a comprehensive compilation of diverse novel methods related to graph edit distance that have been developed and researched in the course of a recent research project that has been conducted under my supervision. In particular, the second part of the present book summarizes and consolidates the results of the following articles.<sup>1</sup>

1. Kaspar Riesen, Horst Bunke: Improving Bipartite Graph Edit Distance Approximation using Various Search Strategies. *Pattern Recognition* 48(4): 1349–1363 (2015).
2. Kaspar Riesen, Andreas Fischer, Horst Bunke: Estimating Graph Edit Distance Using Lower and Upper Bounds of Bipartite Approximations. *IJPRAI* 29(2) (2015).
3. Miquel Ferrer, Francesc Serratosa, Kaspar Riesen: Improving Bipartite Graph Matching by Assessing the Assignment Confidence. *Pattern Recognition Letters*, 2015. Accepted for Publication.

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<sup>1</sup>We reuse several text excerpts, tables, and figures from the corresponding original publications with permission from *Elsevier*, *World Scientific*, and *IEEE*.

4. Kaspar Riesen, Miquel Ferrer: Predicting the Correctness of Node Assignments in Bipartite Graph Matching. Pattern Recognition Letters, 2015. Accepted for Publication.
5. Kaspar Riesen, Miquel Ferrer, Horst Bunke: Approximate Graph Edit Distance in Quadratic Time. IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB), 2015. Accepted for Publication.

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