Editorial

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1 Introduction

It is our great honour to bring this special issue on Large-scale pattern recognition and distributed intelligent systems for the *Journal of Intelligent Systems Technologies and Applications*.

In recent years, the large-scale pattern recognition and distributed intelligent systems have attracted much attention in the pattern recognition community. Problems in these areas are not only academically challenging for the inherent engineering complexity, but also are derived or motivated from advanced applications in computer vision,

engineering and social sciences. For many surveillance systems, large-scale pattern recognition plays an important role for success and distributed intelligent system design is ubiquitous in engineering systems, such as smart home, intelligent robots, etc.

From a theoretical perspective, large-scale pattern recognition brings new techniques from mathematics in statistics, graph theory and fuzzy theory. From a practical perspective, these techniques will enhance many engineering system performance when they are applied to intelligent system design. Research in these areas has been highly rewarding and deserving.

Rapid progress in the areas is evidenced by the recent development of novel results as well as powerful new tools. This special issue focuses on the progress made and helps usher in the next phase of developments. Numerous high-quality submissions were received from many countries around the world and were peer reviewed in accordance with the guidelines of the Journal. This special issue contains 11 representative papers addressing a number of important technical problems, and describes the latest research results and new directions in the areas of the large-scale pattern recognition and distributed intelligent system design. The papers also cover a wide range of theoretical issues as well as their practical applications, which can be broadly divided into three subjects.

The first subject is on new techniques and domains for the large-scale pattern recognition. There are five works addressing the fundamental issues on this subject with different approaches. Irniger and Bunks use graphs to represent the feature factors in large scale database and address some implementation issues in pattern recognition process. Huang et al. deal with pattern recognition and address the ranking of graph nodes to have effective recognition performance using graph theory. Wang et al. use the level set approach to investigate the object segmentation and recognition problems by an optimisation process. Tiahyadi et al. propose a new approach for face recognition through the ordinal correlation approach, which is based on the structure properties of images instead of the direct pixel values. Zhao et al. investigate the popular Bayesian classifier by designing the descretisation algorithm to improve its performance.

The second subject in this special issue is devoted to the distributed intelligent system design with three important papers. He et al. propose a centralised peer-to-peer streaming scheme over hybrid wireless networks to mitigate congestion at the access point in wireless local networks. Several significant advantages are demonstrated by model analysis and simulations. Another smart design model proposed by Song et al. focuses on providing an optimal solution for a mobile sensor trajectory scheduling under non-holomonic constraints under the framework of optimal control. For hybrid environmental scene films, Moncrieff and Venkatesh propose a narrative structure detection approach for films via analysing the audio pace in the film and extend the important concept in film visual analysis ‘tempo’ to audio applications.

Last but not the least, this special issue concludes by presenting three pieces of work dedicated to mathematical theory with applications to the large-scale pattern recognition problems. Jiang proposes a recurrent neural network model to solve time-varying linear equations efficiently with possible applications in pattern recognition. Krishnan et al. propose a novel explicit optimisation algorithm on manifold to register 3D point within a common reference frame, which has potential applications in computer vision. Liu et al. investigate the EI algebra structure generated from the data attributes, which has many potential applications in pattern recognition within the framework of fuzzy approximation.

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