

Computing and Communication Technologies

Preface

This issue contains six papers presented during the Ninth IEEE RIVF International Conference on Computing and Communication Technologies (RIVF 2012), held in Ho Chi Minh City (Vietnam) in the period Feb. 27 – Mar. 01, 2012. Since its inception in 2003, the RIVF conference – Research, Innovation, and Vision for the Future – has become a major international scientific event in the field of Computing, Communication and Information Technologies.

RIVF 2012 received 141 papers from 26 countries, submitted to seven specialised tracks of the conference. Each submission was first evaluated by at least two reviewers, and over two third of them by three or four reviewers, followed by discussions with the track chairs. Finally, the program chairs had an overall review of the recommendations by the track chairs, and decided to accept 35 long papers and 24 short papers, resulting in the acceptance rates of 41.8%. The conference program also included a poster session for authors to present their on-going work.

The authors of top ten papers that received the highest evaluation scores were invited to submit the extended versions of their contributions. After an additional review process (at least two reviewers for each paper), six papers were selected and included in this special issue. To help the reader to get a better insight into this special issue, we provide brief overviews for each of the papers of this issue.

In the paper *Quadratic Algorithms for Testing of Codes and \diamond -Codes*, Nguyen Dinh Han, Ho Ngoc Vinh, Dang Quyet Thang and Phan Trung Huy present a modification of the Sardinas-Patterson's test that can deduce more effective testing algorithm for codes. As a consequence, for a given at input a regular language X defined by a tuple (ϕ, M, B) , where $\phi : A^* \rightarrow M$ is a monoid morphism saturating X , M is a finite monoid, $B \subseteq M$, $X = \phi^{-1}(B)$, the authors established an algorithm that decides in time $O(n^2)$ whether X is a code, where $n = |M|$ can be chosen as the finite index of X . Also the quadratic algorithm for testing of \diamond -codes is also established.

The paper by Cuong Hoang, Anh-Cuong Le, Phuong-Thai Nguyen, Son Bao Pham and Tu Bao Ho on *An Efficient Framework for Extracting Parallel Sentences from Non-Parallel Corpora* challenges with the problem of building a bilingual corpus for English and Vietnamese languages, which is large enough for building a real statistical machine translation. This work presents a framework for effectively extracting parallel sentences from non-parallel corpora that are richly available in the Internet resources including Wikipedia. The proposed framework, based on a bootstrapping method and strengthened by using a new measurement for estimating the similarity between two bilingual sentences, results in significantly

improving the performance of statistical machine translation systems. The authors conduct experiment for the language pair of English and Vietnamese and obtain promising results on both constructing parallel corpora and improving the accuracy of machine translation from English to Vietnamese. This paper received the "Best Paper" award at the conference.

The paper *Unsupervised and Interactive Semi-supervised Clustering for Large Image Database Indexing and Retrieval* by Hien Phuong Lai, Muriel Visani, Alain Boucher and Jean-Marc Ogier deals with the feature space structuring methods for finding information in large image databases. Clustering, a kind of feature space structuring, may organize the data set into groups of similar objects without prior knowledge (unsupervised clustering) or with a limited amount of prior knowledge (semi-supervised clustering) in order to facilitate, accelerate and improve the results of further retrieval. The authors present both formal and experimental comparisons of different unsupervised clustering methods for structuring large image databases. They present a new interactive semi-supervised clustering model, which allows users to provide feedback in order to improve the clustering results according to their wishes. The authors use different image databases of increasing sizes to study the scalability of different approaches and compare the proposed method with the semi-supervised HMRF-kmeans clustering method.

In the paper *A Better Heuristic Algorithm for Finding the Closest Trio of 3-colored Points from a Given Set of 3-colored Points on a Plane*, Ngoc Trung Nguyen and Anh-Duc Duong consider the problem of searching for a trio of red-green-blue points from a given set of n red points, m green points and p blue points on a plane, such that the distance between them is smallest. A straightforward exhaustive search algorithm that tests all trios of 3 different colored points and find the closest trio has the complexity of $O(N^3)$, where $N = \max(n, p, q)$. A better heuristic algorithm for this problem, based on 2D Voronoi diagram, has been proposed by the same authors in their previous research. In this paper, the authors proposed a new heuristic algorithm, which has the same theoretical complexity but it performs much better than the previous one.

The paper by San Pham, Viviane Gascon, Tien Dinh on *Heuristics to Solve a Real-world Asymmetric Vehicle Routing Problem with Side Constraints* discusses the case of a public medical clinic offering activities, mostly to the elderly, at a daycare center. Users are brought into the daycare center by bus or by taxi. The global problem consists in defining routes to pick up users while assigning them to time slots in the week. At the first sight, this problem could be viewed as an asymmetric multiple vehicle routing problem. However many additional constraints must be considered. The authors propose a meta heuristic including two phases to solve the problem. In the first phase, the initial solution is determined using one of two proposed constructed algorithms and is improved using tabu search in the second phase. These algorithms are tested on 10 problem instances. Experimental results are presented to verify the accuracy of the proposed solution.

In the paper *Extraction of Discriminative Patterns from Skeleton Sequences for Accurate Action Recognition* by Tran Thang Thanh, Fan Chen, Kazunori Kotani and Bac Le deals with the human action recognition from action videos. The authors applied the MS Kinect technique to extract the human skeletons from action videos and calculate the discriminative patterns from skeleton data. Each action is considered to consist of a sequence of unit actions, each of which is represented by a pattern. Given a skeleton sequence, we first automatically extract the key-frames, and then categorize them into different patterns. The authors use a statistical metric to evaluate the discriminative capability of patterns, and define them as local features for action recognition. Experimental results show that the extracted local descriptors could provide very high accuracy in the action recognition, which demonstrate the efficiency of the proposed method in extracting discriminative unit actions.

We would like to thank the authors of the papers of this issue for their efforts to extend and revise their contributions. We are also grateful to all the reviewers who have given numerous valuable suggestions to the authors. Finally, we would like to thank the Editor-in-chief, Professor Damian Niwiński, for his support for this special issue.

Editors of the issue

Chi Mai Luong,
Institute of Information Technology,
Vietnam Academy of Science and Technology, Vietnam,
email: lcmal@ioit.ac.vn

Vincenzo Piuri,
Department of Computer Science,
Università degli Studi di Milano, Italy,
email: vincenzo.piuri@unimi.it

Hung Son Nguyen,
Institute of Mathematics,
University of Warsaw, Poland,
email: son@mimuw.edu.pl

Warsaw, January 2014