Memetic Comp. (2016) 8:167–168
DOI 10.1007/s12293-016-0209-y

EDITORIAL

Editorial

Meng-Hiot Lim[1]

Published online: 17 August 2016

The dictionary[1] defines meme as being an element of a culture or system of behavior passed among individuals through imitation or other non-genetic means or as an image, video, piece of text, etc., typically humorous or interesting that is copied and spread rapidly often with slight variations. We can easily relate to the fact that based on the definitions above, various aspects and traits of memetic are evident in the techniques described in the papers published earlier in the print issues of this journal. In fact, this is true for most algorithms of problem-solving that inadvertently incorporate some form of evolutionary dynamics with the ultimate aim of uncovering good and desirable patterns, structures, arrangements, etc. Clearly, one should not confine the term evolutionary to strictly imply transformation in a genetic sense. The plethora of techniques that have emerged in recent years as evidenced by the many papers published in this journal are clear indication of the broadness of memetic computing from a problem-solving context. It is therefore meaningful to highlight the misconception of memetic computing as being synonymous to memetic algorithms. While possessing the traits and characteristics of memetic computation, the conventional definition of memetic algorithms is clearly far too restrictive to be meaningful to effectively capture the breadth pertaining to the field of memetic computing.

Here in this issue, I am happy to include five papers that present innovative techniques of computational problem-solving. These papers illustrate the multi-facet applicability of memes, demonstrating how memes can serve as computational units for enhancing the capability of the search.

✉ Meng-Hiot Lim
emhlim@ntu.edu.sg

[1] Nanyang Technological University, Singapore, Singapore

The inspiration of nature in problem-solving is evident in the first paper of this issue by Tawhid and Ali. The social spider optimization (SSO) algorithm is a recent innovation of nature-inspired population based strategy for optimization. Enhancement in the performance of the SSO is achieved by incorporating a simplex Nelder–Mead method for solving integer programming and minimax problems. They validated their approach by applying it on a series of benchmarks. Such enhancement by means of a classical simplex procedure is a clear illustration of how memes can synergistically boost the search performance of population based techniques, an often used conventional framework of memetic computation.

The second paper by Lou and Yuen use constant memory to manage the search history for enhancing the performance of a genetic algorithm. It is common that to improve search performance, memory of the search history is relied upon in reducing the extent of duplicative and unproductive search effort. Such memory if not managed appropriately can become a computational liability and hence adversely affects the search effectiveness. The authors address this by incorporating pruning mechanisms which manifest itself as parameter-less adaptive mutation operators. They experimented with the various schemes to evaluate the effect of the loss in search history information due to the imposed limit on memory capacity.

The paper by Mirsaleh and Meybodi addresses the vertex coloring problem. The practical significance of vertex coloring from an optimization or decision problem standpoint is manifold, particularly in applications where the problem scenarios can be conveniently represented as graphs. The objective is to color the graph where no two adjacent vertices are of the same color. Combining a memetic algorithm

[1] http://www.oxforddictionaries.com/definition/english/meme.

and irregular cellular learning automaton, the authors show the potential of their approach and obtained better results in their simulation experiments.

In recent years, extreme learning machines have surfaced as a potentially viable machine learning approach through its non-iterative training. The paper by Xiao et al. applies a self-adaptive evolutionary extreme learning machine (E-ELM) for electricity price forecasting. For high-dimensional problems, the time-consuming E-ELM is supplemented with a pseudo differential evolution (DE) algorithm to enhance the performance of E-ELM to achieve more reliable prediction. The pseudo-DE results in simpler mathematical mapping instead of complicated functional relationship and the performance was validated by testing on several benchmarks.

The final paper by Samma et al. focus on recognition of characters from vehicle license plates. They achieved this through a symbiotic approach of fuzzy support vector machine (SVM) and a memetic particle swarm optimization (MPSO). Their MPSO is a three-layer framework of global, component and local optimization layers. The purpose of the MPSO is to tune parameters of the fuzzy SVM and to perform feature and training instance selection. The viability of the approach was tested on image samples captured from cars' license plates.

This issue has presented some interesting and novel aspects of memes in problem-solving. I acknowledge the contributions of the reviewers for their diligence in reviewing the papers and the Editors who managed the review of the papers. They are the ones behind the scene who helped to make this issue possible, ensuring the quality and consistency of the papers selected for publication. I am hopeful that papers submitted for publication consideration in the future will do more to establish a closer technical link to the scope and objectives of this journal from a memetic standpoint.