World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

A Dynamic Software Product Line Approach to Self-Adaptive Genetic Algorithms

Authors : Abdelghani Alidra, Mohamed Tahar Kimour

Abstract : Genetic algorithm must adapt themselves at design time to cope with the search problem specific requirements and at runtime to balance exploration and convergence objectives. In a previous article, we have shown that modeling and implementing Genetic Algorithms (GA) using the software product line (SPL) paradigm is very appreciable because they constitute a product family sharing a common base of code. In the present article we propose to extend the use of the feature model of the genetic algorithms family to model the potential states of the GA in what is called a Dynamic Software Product Line. The objective of this paper is the systematic generation of a reconfigurable architecture that supports the dynamic of the GA and which is easily deduced from the feature model. The resultant GA is able to perform dynamic reconfiguration autonomously to fasten the convergence process while producing better solutions. Another important advantage of our approach is the exploitation of recent advances in the domain of dynamic SPLs to enhance the performance of the GAs.

Keywords : self-adaptive genetic algorithms, software engineering, dynamic software product lines, reconfigurable architecture
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020

Open Science Index, Mathematical and Computational Sciences Vol:14, No:12, 2020 publications.waset.org/abstracts/37396.pdf