Parallel Implementation of Grammatical Evolution

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Grammatical Evolution (GE) is one of the evolutionary computations, which can determine the function or program or program segment satisfying the design objective just like Genetic Programming (GP). The important feature of GE is to define the translation rule from the genotype (bit-string) to the phenotype (function or program) in advance. The genotype (bit-string) is evolved toward better individuals by using the translation rule and genetic algorithm.

The aim of this study is the effectiveness of parallel implementation to GE. The parallel implementation is based on simple island model. The full population is substituted into sub-populations. The evolution in subpopulations is performed individually and some individuals are exchanged between subpopulations with some frequency. Exchange of individuals is called as migration. Better individual migration and randomly selected individual migration are compared.

The symbolic regression problem is considered as a numerical example. The results show that success rate of randomly selected individual migration is relatively better than that of better individual migration. In case of randomly selected individual migration, low migration frequency is better when the subpopulation is bigger and high migration frequency is better when the subpopulation is smaller.

Keywords: Grammatical Evolution, Island Model, Symbolic Regression.