Promoting Diversity in Evolutionary Algorithms: an Updated Bibliography

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1. CLASSIFICATION

This short paper contains an extended list of references to diversity preservation methodologies, classified following the taxonomy presented in a previous publication. The list has been updated according to the contributions sent to the workshop *Measuring and Promoting Diversity in Evolutionary Computation*, held during the conference GECCO 2016. As we are presenting just a small update of the original survey, in Table 1 we report the classification limited to the first two axes, for simplicity. For more information, see [26].

The proposed classification of diversity preservation methods takes into account three axes: level the method acts at (lineage, genotype, phenotype); point of selection (parents, survival); dependency on the current population context (context-dependent, context-independent). Considering Table 1, column **ME** describes the level at which a methodology evaluates population diversity ($\mathcal{L}$ for lineage, $\mathcal{G}$ for genome, $\mathcal{P}$ for phenotype); and column **Selection** indicates the point of the evolutionary process where diversity preservation is introduced, namely P for parent selection, S for survival selection.

Methodology	ME	Selection
Adaptive Species Discovery [13]	$\mathcal{G}$	P+S
Aging [5]	$\mathcal{L}$	P+S
Allopatric selection [29]	$\mathcal{L}$	S
Cellular EAs [22]	$\mathcal{L}$	P+S
Clearing [20]	$\mathcal{G}$	P+S
Crowded-comparison operator [10]	$\mathcal{P}$	P
Delta/pseudo entropy [27]	$\mathcal{G}$	P
Deterministic crowding [19]	$\mathcal{L}$	S
Diversifiers [18]	$\mathcal{G}$	P+S
Dynamic Fitness Sharing [12]	$\mathcal{G}$	P+S
Dynamic Niche Identification [11]	$\mathcal{G}$	P+S
Extinction [14]	$\mathcal{P}$	S
FOCUS [6]	$\mathcal{G}$	S
Fitness sharing [8]	$\mathcal{G}$	P+S
Gender [2]	$\mathcal{L}$	P
Genetic diversity evaluation [28]	$\mathcal{G}$	S
Hierarchical fair competition [17]	$\mathcal{P}$	P+S
Island models [30]	$\mathcal{L}$	P+S
MULTI [25]	$\mathcal{G}$	S
MULTI DYNAMIC [24]	$\mathcal{G}$	S
Random immigrants [15]	$\mathcal{P}$	P+S
Reference points partitioning [9]	$\mathcal{G}$	S
Restricted tournament [16]	$\mathcal{G}$	S
Segregation [1]	$\mathcal{L}$	P+S
Sequential niching [3]	$\mathcal{G}$	S
Standard Crowding [7]	$\mathcal{G}$	S
Strength pareto [31]	$\mathcal{P}$	P
Tarpeian method [21]	$\mathcal{G}$	P+S
Two-level Diversity Selection [4]	$\mathcal{G}$	P
VEGA [23]	$\mathcal{P}$	P

Table 1: Essential bibliography and proposed classification of methods for diversity promotion, additions since [26] are highlighted in bold.

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Authors are listed in alphabetic order

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