Constraint Satisfaction Methods

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September 21, 2020

There are a variety of techniques to solve Constraint Satisfaction Problems with EAs. Six such techniques are:

• Ignore Constraints

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When to use Only if invalid solutions have an inherently lower fitness than valid solutions which means that the fitness function implicitly accounts for the constraints.

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- Cons Computational overhead is proportional to the ratio of invalid to total solutions; if that ratio gets too high, then the overhead makes this approach infeasible. Also, the largest diameter of invalid space imposes a typically unknown lower bound on mutation rate to guarantee reachability of the global optimum.

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When to use Only if (a) the ratio of invalid to total solutions is sufficiently low to make the overhead of generating solutions and checking their validity lower than the overhead of generating guaranteed valid solutions or imposing a penalty function, and (b) global maximum reachability is guaranteed.

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When to use If you cannot guarantee global maximum reachability from the starting population and a high quality decoder function cannot be designed.

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- Repair Function

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- Closed Feasible Solution Space

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- Feasible Decoder

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