NOVA IMS Information Management School

Neural and Evolutionary Learning

Class 3 - Geometric Semantic Genetic Programming

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Geometric Semantic Genetic Programming

	GA	Tree-based GP	GSGP
Genome	Constant length	Lisp-like tree	Lisp-like tree
Task type	Optimization	Many tasks, including ML	Many tasks, including ML
Population initialization	Random values	Random trees*	Random trees*
Crossover	“Blind" genotype variation**	“Blind" genotype variation**	Semantic (phenotype-based) genotype variation
Mutation	“Blind" genotype variation**	“Blind" genotype variation**	Semantic (phenotype-based) genotype variation

Important!

Remind that the neighbourhood of the fitness landscape is defined by the genetic operators. Therefore, the use of these Geometric Semantic operators enables the problem to be optimized in the error space, transforming any problem into a CONO one.

Geometric Semantic Genetic Programming

- GSGP Crossover

$$T_{XO} = T_1 \times T_R + T_2 \times (1 - T_R)$$

- GSGP Mutation

$$T_M = T + ms \times (T_{R1} - T_{R2})$$

slim_gsgp NOVA IMS library

- Let's take a look at the codes.

Questions?

https://forms.gle/EV9VkExNtfNckMSM8

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