AS-MOSES

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MOSES: Past, Present, Future

- MOSES: Meta-Optimization Semantics Evolutionary Search, Moshe Looks
- Program Learner: Attempt to find fit programs
- About to be ported for the AtomSpace

MOSES: Past, Present, Future

What makes MOSES special

- Reduction in normal form

$$f(x) = 1 * x + 0 \quad \Rightarrow \quad f(x) = x$$

  - Avoid over-representation
  - Increase syntax vs semantics correlation
  - Simplify subsequent evolution

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  - Islands of diverse program subspaces
  - “Clever” representation building

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  - Islands of diverse program subspaces
  - “Clever” representation building
- Optimization
  - Attempt to learn the fitness landscape
  - In practice Stochastic Hillclimbing + Crossover

AS-MOSES: Port to the AtomSpace

Why porting MOSES to the AtomSpace?

Synergies between MOSES and the rest of OpenCog

- Atomese fitness function
- Atomese candidate programs
- Search in the AtomSpace
- Integrate background knowledge
- Meta-learning

AS-MOSES: Atomese

Program example:

$$f(x, y) = x + 2 * y$$

Atomese:

```
(Lambda
  (VariableList
    (Variable "x")
    (Variable "y")
  (Plus
    (Variable "x")
    (Times
      (Number 2)
      (Variable "y")))))
```

AS-MOSES: Deme Representation

Representation:

$$f(x) = [1, -1] * x + [0, 0.5, 1]$$

Atomese:

```
(Quote
  (Lambda
    (Variable "x")
    (Plus
      (Times
        (Unquote (Variable "k0"))
        (Variable "x"))
      (Unquote (Variable "k1")))))
```

$k0$ and $k1$ are the knob variables