

CAP6938

Neuroevolution and  
Artificial Embryogeny

NeuroEvolution of Augmenting  
Topologies  
(NEAT)

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February 6, 2006

# TWEANN Problems Reminder

- Competing conventions problem
  - Topology matching problem
- Initial population topology randomization
  - Defective starter genomes
  - Unnecessarily high-dimensional search space
- Loss of innovative structures
  - More complex can't compete in the short run
  - Need to protect innovation
- NEAT directly addresses these challenges

# Solutions: NEAT

- *Historical markings* match up different structures
- Speciation
  - Keeps incompatible networks apart
  - Protects innovation
- Incremental growth from minimal structure, i.e. *complexification*
  - Avoids searching in unnecessarily high-d space
  - Makes finding high-d solutions possible