

CAP6938

Neuroevolution and
Developmental Encoding

NeuroEvolution of Augmenting
Topologies
(NEAT)

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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