Neuroevolution of Intelligent Agents
NeurIPS 2026 Tutorial Outline

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Time	Content
0–10 min	**Motivation** - Gradient Descent vs. exploration - Prediction vs. prescription (i.e. agents) - Imitation vs. creativity
10–30 min	**Techniques** - Fundamentals of neuroevolution: population-based search; weight optimization; topology evolution (i.e. NEAT) - Taking advantage of indirect encodings: developmental encod- ings; hypernetworks - Taking advantage of diversity: novelty search; quality diversity (i.e. MAP-Elites)
30–60 min	**Evolving behavior** - Control and strategy: extrapolation techniques; multimodal be- havior techniques; robotics, game playing applications - Decision making: surrogate modeling techniques; pandemic optimization, climate change applications - Collective systems: cooperative coevolution of multiagent sys- tems; competitive coevolution, open-ended arms-race
60–80 min	**Evolving architectures** - Neural architecture search: nodes, modules, topologies, multitask systems; CoDeepNEAT, AmoebaNet examples - Metalearning: loss functions, activation functions, learning meth- ods; comparison to human designs in the age prediction task
80–110 min	**Synergies with other fields** - Neuroevolution and RL: Combining population and agent time scales; Evolving function approximations and starting points - Neuroevolution and GenAI: using neuroevolution to enhance GenAI; using GenAI to enhance neuroevolution - Neuroevolution and Biology: evolutionary origins of circuitry; role of environmental constraints; Emergence of intelligence; Proposal: Evolution of language
110–140 min	**Hands-on exercise** - Neuroevolution for control - Evolutionary model merging - Quality diversity
140–150 min	**Conclusion**