# Neuroevolution of Augmenting Topologies

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## I. Introduction

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## II. Overview

most commonly applied in artificial life, general game playing and evolutionary robotics. main benefit is that Neuroevolution can be applied more widely than supervised learning algorithms [...] [as it] requires only a measure of a network's performance at a task

Neuroevolution is in competition with Gradient Descent. Around 2017 researchers at Uber stated they had found that simple structural Neuroevolution algorithms were competitive with sophisticated modern industry-standard gradient-descent deep learning algorithms, in part because Neuroevolution was found to be less likely to get stuck in local minima

### A. Classification of Neuroevolution Algorithms

Conventional Neuroevolution: evolve only the strength of the connection weights for a fixed network topology

TWEANNs (Topology and Weight Evolving Artificial Neural Network): evolve both the topology of the network and its weights

Parallel or sequential Evolving: A separate distinction can be made between methods that evolve the structure of ANNs in parallel to its parameters and those that develop them separately

### B. Genotypes and Direct/Indirect Encoding

Evolutionary algorithms operate on genotypes. In neuroevolution, a genotype is mapped to a neural network phenotype that is evaluated on some task to derive its fitness.

## III. Conclusion

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## References

[1] Example Cite, *Source*, Apr. 2019. www.example.com