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# Neuroevolución

## Gene I. Sher

Handbook of Neuroevolution Through Erlang

> Handbook of Neuroevolution Through Erlang presents both the theory behind, and the methodology of, developing a neuroevolutionary-based computational intelligence system using Erlang. With a foreword written by Joe Armstrong, this handbook offers an extensive tutorial for creating a state of the art Topology and Weight Evolving Artificial Neural Network (TWEANN) platform. In a step-by-step format, the reader is guided from a single simulated neuron to a complete system. By following these steps, the reader will be able to use novel technology to build a TWEANN system, which can be applied to Artificial Life simulation, and Forex trading. Because of Erlang's architecture, it perfectly matches that of evolutionary and neurocomptational systems. As a programming language, it is a concurrent, message passing paradigm which allows the developers to make full use of the multi-core & multi-cpu systems. Handbook of Neuroevolution Through Erlang explains how to leverage Erlang's features in the field of machine learning, and the system's real world applications, ranging from algorithmic financial trading to artificial life and robotics.

Discover & eXplore Neural Network (DXNN) Platform, a Modular TWEANN

> In this paper I present a novel type of Topology and Weight Evolving Artificial Neural Network (TWEANN) system called Modular Discover & eXplore Neural Network (DXNN). Modular DXNN utilizes a hierarchical/modular topology which allows for highly scalable and dynamically granular systems to evolve. Among the novel features discussed in this paper is a simple and database friendly encoding for hierarchical/modular NNs, a new selection method aimed at producing highly compact and fit individuals within the population, a "Targeted Tunning" system aimed at alleviating the curse of dimensionality, and a two phase based neuroevolutionary approach which yields high population diversity and removes the need for speciation algorithms. I will discuss DXNN's mutation operators which are aimed at improving its efficiency, expandability, and capabilities through a built in feature selection method that allows for the evolved system to expand, discover, and explore new sensors and actuators. Finally I will compare DXNN platform to other state of the art TWEANNs on a control task to demonstrate its superior ability to produce highly compact solutions faster than its competitors.

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