

# An Analysis of Reinforced Neural Networks

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## Abstract

In late 2017 DeepMind announced a groundbreaking system in a scientific paper [1] and the results were astonishing. The system was called AlphaZero and utilized *artificial neural networks* in order to teach itself the game chess without any proprietary knowledge, except the rules. After approximately 9 hours it was able to beat the strongest hand-crafted engines, such as Stockfish and it had learned centuries of human knowledge of chess. In this paper we aim to study the effectiveness of different *neural networks* such as the one used in AlphaZero. To be precise, we will analyze the efficiency of those networks in combination with varying *algorithms*, *optimizations*, *hyperparameters* and *architetures* applied to the classic game of connect four.

**Keywords**— Machine Learning, AI, Reinforcement Learning, Neural Network, Deep Learning

## References

- [1] Silver, David; Hubert, Thomas; Schrittwieser, Julian; Antonoglou, Ioannis; Lai, Matthew; Guez, Arthur; Lanctot, Marc; Sifre, Laurent; Kumaran, Dhharshan; Graepel, Thore; Lillicrap, Timothy; Simonyan, Karen; Hassabis, Demis (December 5, 2017). "Mastering Chess and Shogi by Self-Play with a General Reinforcement Learning Algorithm".