Frankfurt University of Applied Sciences
Fachbereich 2: Informatik und Ingenieurwissenschaften
Informatik (B.Sc.)

Creating virtual chess commentators using neural networks

Subtitle

Abstract

This paper deals with the question of how neural networks can be used to create a comprehensive analysis of chess games, which can be used to generate textual, human-understandable, commentary. In particular, we will look at what is needed to represent a chess board that can be used by the neural network to plan and compare moves in order to make an appropriate evaluation of a game of chess. Based on this, we will then explore how the neural network can convert the evaluation into natural language that humans can understand.

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Declaration of authorship

I hereby certify that the following project report was written entirely by me and is based on my work unless otherwise indicated. I am aware of the University's regulations regarding plagiarism, including the following actions in the event of a violation. Any form of use of outside work is identified where appropriate and noted in the sources.

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1 Introduction

In the mid-20th century, computer chess experienced its first breakthroughs thanks to the work of scientists like Alan Turing and Claude Shannon. Alan Turing, the pioneer of artificial intelligence, was convinced that games were an ideal model system for machine learning.[1] This prediction has come true, and machine learning have proven to be an essential part of many chess engine today. In particular, recent projects such as AlphaZero, developed by DeepMind, show how efficient programs which use neural networks are in analyzing board games compared to traditionally used algorithms such as alpha-beta search.[2] Although chess engines have become a powerful tool, they have a lack of transparency regarding the moves they perform. Therefore, professional chess players and commentators are often needed to explain the intention of these moves. This dependence on human chess commentators can be a drawback, since moves found by computers can be misinterpreted and, above all, appear incomprehensible to non-professional chess players. In the following, I will explore the question of how this opacity can be overcome using a neural network to create a virtual chess commentator that uses a built-in chess engine to translate the engine's intentions into a language that humans can understand.

2 Chess Commentator powered by a Neural Network

2.1 General Approach

In the implementation, it plays an important role what kind and how much information the neural network receives about the analysis of the individual moves in order to generate the most accurate translations possible. This is influenced by the placement of the chess engine, which can be placed either internally or externally. Internal means that the engine works as part of the neural network, which also includes the chess commentator. When placed externally, the neural net is only used for the translations of the chess commentator and uses the analysis of an outside placed engine. In the following, we will only focus on the internal placement, as this achieved the best results.

2.2 Chess Engine

2.2.1 Representation

2.2.2 Move Prediction

2.2.3 State Evaluation

2.3 Chess Commentator

[1] Cf. Levy et al. 1982, p. 44-45

[2] See Silver et al. 2018 p. 1

References

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