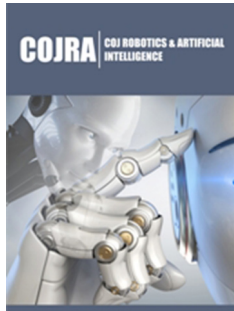


Stockfish 14+ with NNUE: An Example of Artificial Intelligence Utility in Chess

ISSN: 2832-4463



***Corresponding author:** William Bart,
162 Educational Sciences Building,
University of Minnesota, 56 East River
Road, Minneapolis, Minnesota 55455, USA

Submission: 📅 September 20, 2023

Published: 📅 November 02, 2023

Volume 3- Issue 3

How to cite this article: William Bart*.
Stockfish 14+ with NNUE: An Example of
Artificial Intelligence Utility in Chess. COJ
Rob Artificial Intel. 3(3). COJRA. 000563.
2023.
DOI: [10.31031/COJRA.2023.03.000563](https://doi.org/10.31031/COJRA.2023.03.000563)

Copyright@ William Bart, This article is
distributed under the terms of the Creative
Commons Attribution 4.0 International
License, which permits unrestricted use
and redistribution provided that the
original author and source are credited.

William Bart*

Department of Educational Psychology, University of Minnesota, USA

Opinion

This brief article reviews Stockfish 14+ with NNUE, a powerful chess engine with an artificial intelligence component, as it is used on lichess.org, a popular chess-related website, to analyze chess games, to evaluate chess moves and resulting chess positions, and to determine arguably best moves. What is amazing is that this detailed chess game analysis is free on lichess.org.

Artificial intelligence (AI) has been and continues to be a vital element in the operations of the international chess community. Please consider the case of Alpha Zero, which is a computer program developed by Deep Mind [1], an artificial intelligence research company, to master the complex games of chess, shogi, and Go. Alpha Zero is a computer program that can play games of chess and that makes use of artificial intelligence.

There are many examples of AI devices used in chess. This brief review focuses on one AI device, the chess engine termed Stockfish 14+ with NNUE, that is available on the chess-related website, lichess.org. On that website, one may enter a chess game and then subjects the game to an analysis of moves with the use of Stockfish 14+ with NNUE to identify best moves at each part of the game. The NNUE component is an important AI component that is used to evaluate chess positions in the game. The best moves determined by Stockfish 14+ are not explained in lichess.org but require a human or some artificial source with substantial chess knowledge to interpret the best moves in a lucid manner.

To appreciate more fully the example being cited, some chess-related terminology is warranted. A computer program that can play chess is also called a chess engine or chess bot. Every chess engine operates at a certain level of chess and an Elo rating is often used as a measure of the level of chess skill of a chess engine or a human chess player. The Elo rating is the international measure of chess proficiency developed by Arpad Elo that is used to indicate the level of chess proficiency of any human or artificial chess player worldwide. Elo ratings can range from 0 that indicates the absence of chess skill to 2839 that is the Elo rating of Magnus Carlsen, the highest rated human player, and even beyond the Elo rating of the highest rated player [2]. Contemporary chess engines such as Alpha Zero and Stockfish tend to have Elo ratings higher than 3200 and can evaluate chess positions that result from sequences of more than five moves.

The purpose of Stockfish is to play chess well and it does that very well. Stockfish did not teach itself as Alpha Zero did. Stockfish incorporated chess knowledge as presented in books on chess openings but also incorporated advanced chess programming. Stockfish could most likely defeat or draw against all earlier versions of Stockfish. Chess programmers associated with the Stockfish project were responsible for various versions of Stockfish [3].

Stockfish 14 with NNUE is a chess engine that is very strong and widely available. It is free and open-source and has an Elo rating of approximately 3550. It involves NNUE, an efficiently updatable neural network used to evaluate chess positions. It can calculate approximately 40 million positions per second [4].

Stockfish 14+ with NNUE is a chess engine that is used on lichess.org. It is a slight modification of Stockfish 14 with NNUE. Its Elo rating is only slightly weaker than Stockfish 14 with NNUE, i.e., only approximately 7 Elo rating points weaker than the Elo rating of Stockfish 14 with NNUE. NNUE (efficiently updateable neural network) is an artificial intelligence component of Stockfish 14+ and is used to evaluate chess positions. NNUE was developed in Japan and has been a vital component of chess engines that have outstanding records at international competitions for chess engines [5].

Lichess.org is a free and open-source internet chess server run by a non-profit organization. Lichess.org is a complex chess-related website that has many features including hosting entire chess tournaments. It is used by chess players and organizations such as the St Louis Chess Club to analyze chess games and to improve human chess play.

To analyze any chess game, one enters the chess moves in the chess game onto the board editor of lichess.org [6]. That position then subjects the moves of the chess game to analysis by Stockfish 14+ by using the analysis board also available on lichess.org [7]. Stockfish 14+ determines the next best move within seconds. To understand the best moves determined by Stockfish 14+ does require chess knowledge.

Lichess.org is an extremely popular website used to analyze chess games and to improve chess play. It provides a fine setting to demonstrate how useful artificial intelligence is to the international chess community.

References

1. Google DeepMind.
2. FIDE Ratings (2023).
3. Stockfish.
4. Stockfish 14 (2021).
5. Sadler M (2020) The silicon road to chess improvement. New in Chess.
6. Board editor.
7. Analysis board.