Playing Draughts using Neural Networks and Genetic Algorithms

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Outline

Problem Description

A problem in Computer Science

Presently, competitive Draughts AI players are currently designed to play at a fixed ability.
While it has produced very competitive and intelligent players, they require manual modifications in order to improve its performance.
This is due to their dependency on pre-defined move databases, where optimal moves are pre-calculated, and recalled when necessary.
By combining Neural Networks and Genetic Algorithms, this issue could possibly be solved by creating a player that can grow in ability over time, without the dependency on move-banks.

Motivation

Why have I chosen to tackle this?

- Enjoyed the AI Search module
- Want to learn about Machine Learning (unfortunately not an option this year)
- I love board games!

Related Work

Similar works of art but no cigar

Samuel (59')

Uses Genetic Algorithms to improve coefficents of a set of heuristics to evaluate Draughts games.

Blondie24 (97')

Uses an Evolutionary Algorithm and Neural Networks to evaluate Draughts games. (Quite similar!)

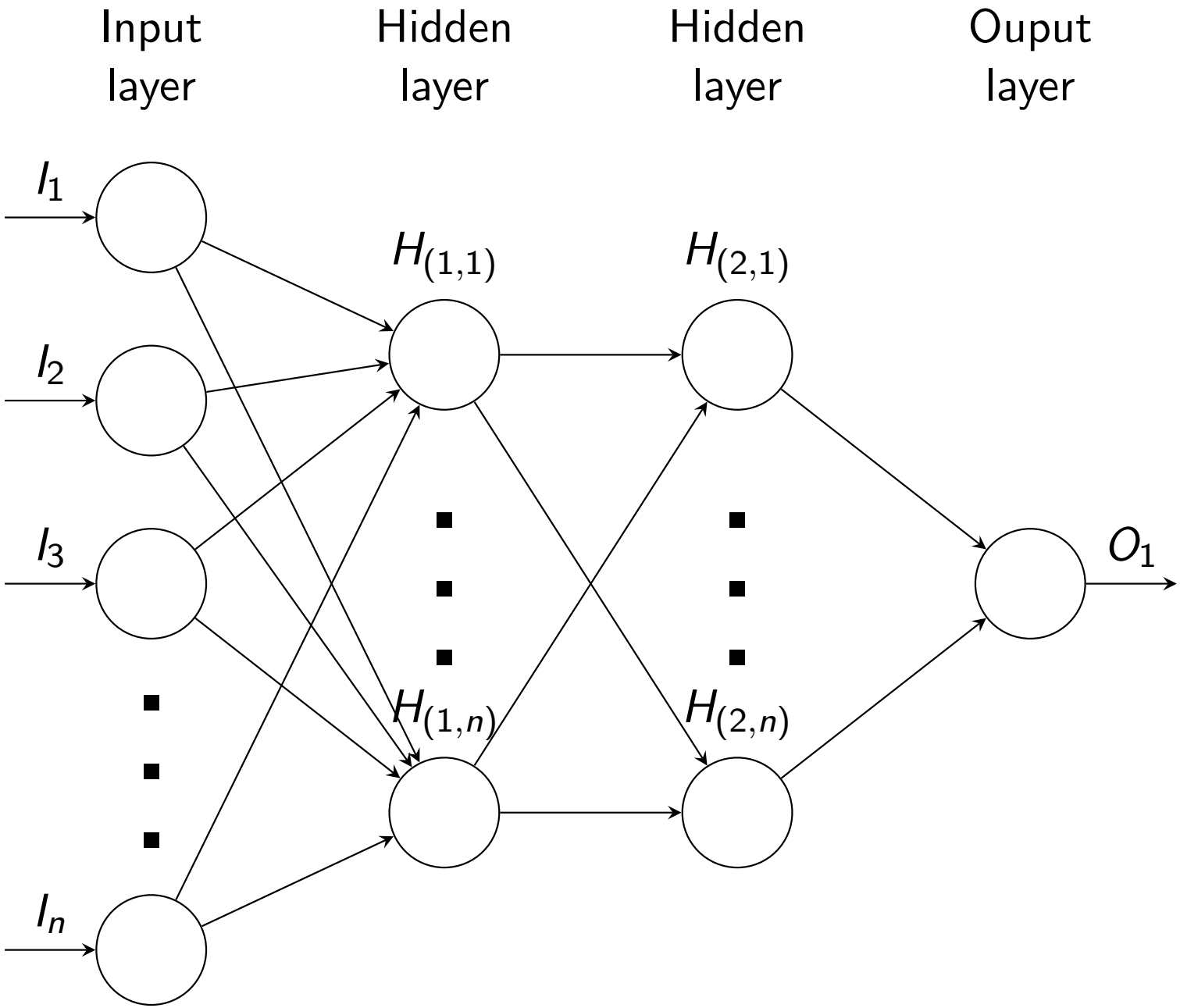
Giraffe (15')

Uses contemporary machine learning techniques to train a Neural Network to evaluate Chess games.

Current Approach

How will I tackle this?

Neural Networks



Checkerboard

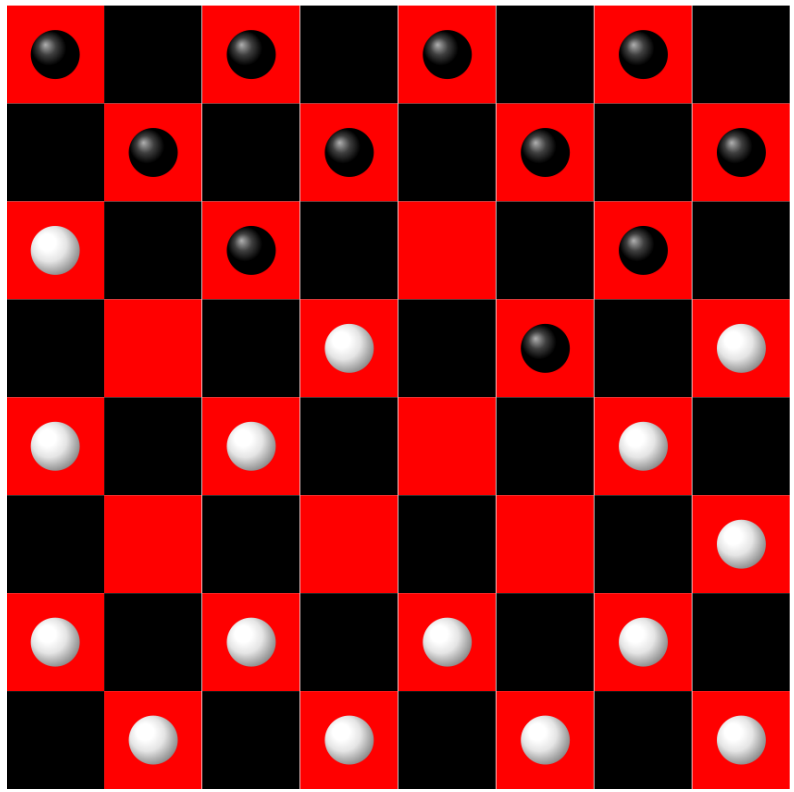


Figure: The indexes of the 32 pieces of the input layer are the immediate values of the positions on the board.

Checkerboard

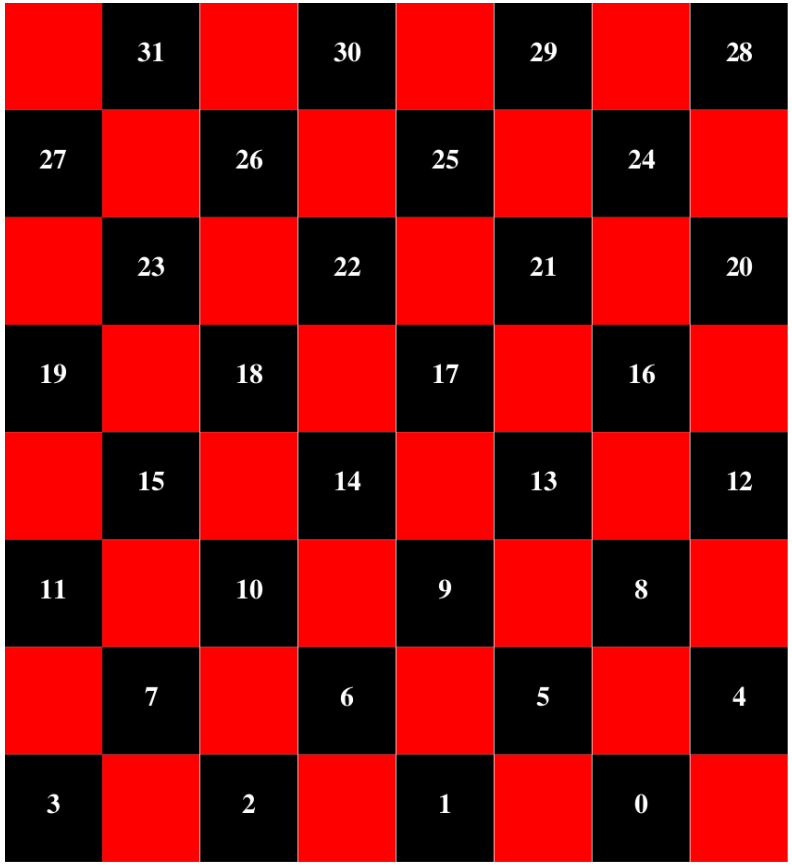
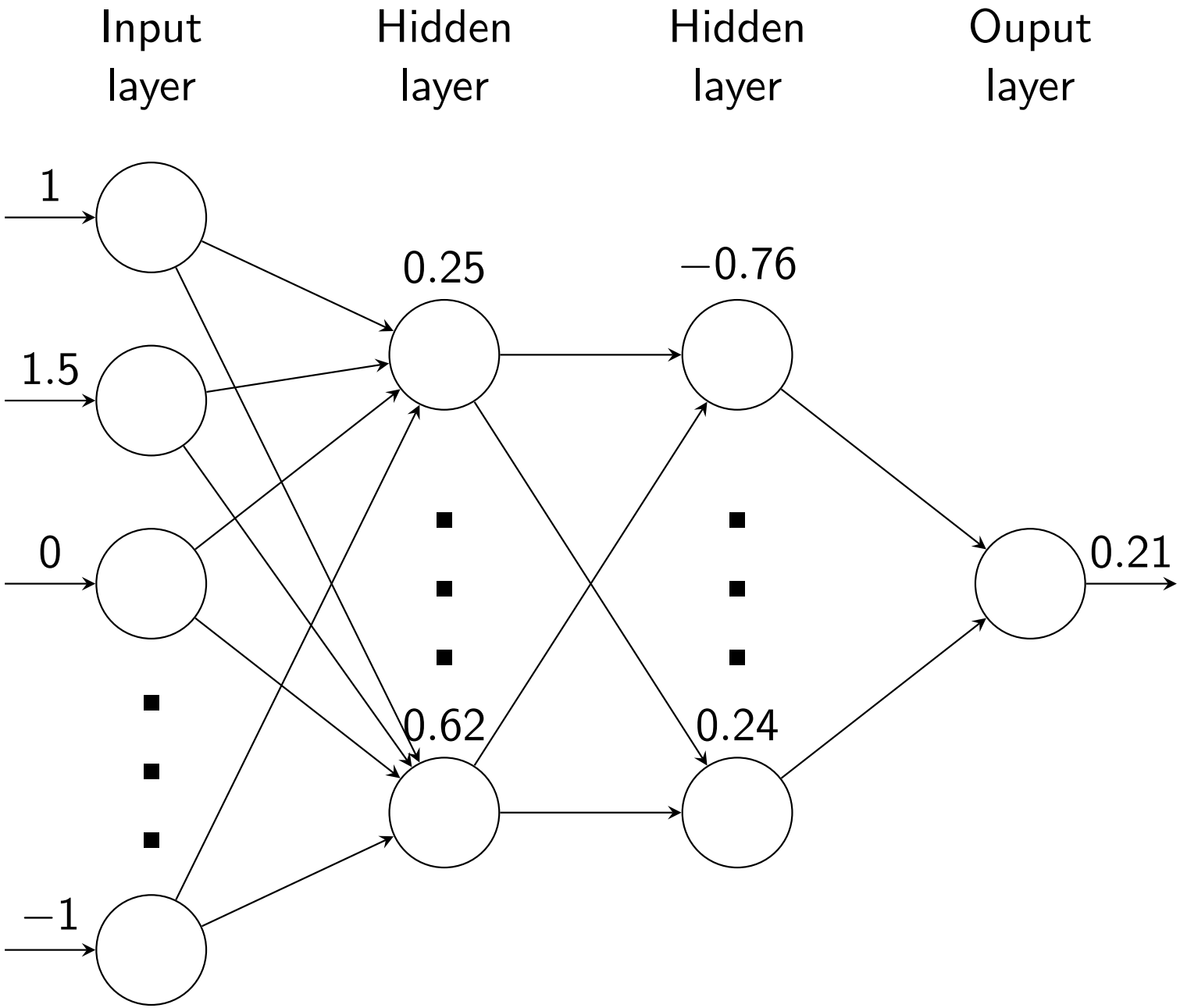


Figure: The indexes of the 32 pieces of the input layer are the immediate values of the positions on the board.

Neural Networks



Template

Current Progress

What have I done already?

- I've created a relatively ok AI bot.
- It plays relatively well!

Remaining Work

What do I still need to do?

Conclusion

What will I accomplish?

I will hopefully accomplish something.

References

Nanos gigantum humeris insidentes

References!