

Senior Project Proposal

For this senior project I propose to develop a chess application with integrated ai algorithm to play the game. The main portion of this project will be to teach the ai how to play chess using a neural network and minimax algorithm. I plan to have the AI play games to be able to build its own database and decision tree. I wanted to do this project because I like video games, especially League of Legends. Initially I thought about creating an AI to play league of legends, but I believe that it is out of scope with my current skills so I decided on doing something simpler that could be scalable once completed. I chose chess because it is a game I am familiar with and has sufficient complexity.

In terms of final product, I want to build a chess application that the user can play against the AI. The target user would be people who wanted to learn chess and play chess. There will be different difficulties which will fit for each skill level. Eventually I want to scale the algorithm to work with different games which would require maintaining the parameters and values of the algorithm.

In terms of programming, I plan to build the chess application either using python or C++ as I am most familiar with C++, but python has a lot of built in libraries for machine learning and is easy to learn. The algorithm and game should be able to be ran on my computer and it can handle the simulations.

Similar projects and research that already exists are:

- <https://lczero.org/>
- <https://stockfishchess.org/>
- <https://mpvooss.github.io/chess.html>
- <https://Chess.com>
- <https://andreasstckl.medium.com/writing-a-chess-program-in-one-day-30daff4610ec>
- https://www.chessprogramming.org/Main_Page
- <https://github.com/CirsteanPaul/Chess-project>

Justification:

This project will be a cumulation of what I have learned in several classes throughout my previous semesters such as:

- Algorithms and Analysis (CMSI 2130)
- Artificial Intelligence (CMSI 3300)
- Probability and Statistics (MATH 361)

And also, Cognitive Systems Design (CMSI 4320) that I am currently taking this semester. It will further extend my understanding of statistical mathematics, machine learning and AI which will be very helpful for the future.

I personally am pretty confident in my skills with python and C++. I also have experienced with creating a database using SQL to efficiently store the simulations results. My minor in mathematics would also help in terms of mathematical programming in the process of creating the algorithms and statistics for the chess moves. I think that this project is feasible to complete in the given semester as there is a lot of resources available to help complete this project. I also think that it is an interesting project with the capability to scale into more games.