

# Final Project Proposal – Group 2 – Marlon

## Introduction

Our group has planned to base our final project around the game of Connect-4.

Each one of us is going to focus on a different aspect of it in the context of Deep Reinforcement Learning with the goal of finding a doable but still meaningful project.

My emphasis in our group will focus on evaluation the performance of a DRL-trained model against an AI which applies basic minimax or database-based search for optimal moves.

## Idea

The plan is to build a model which can play Connect-4 on some level which is probably based on Temporal Difference Learning. For this we will implement a simple, simulation-suitable, Connect-4 engine, the model itself, and some other functionalities used for our model.

My focus will be to implement a minimax and database-based algorithm which is to play against the model to evaluate performance. Additionally, I will evaluate the game-theoretic performance of the model and the algorithms based on positions in Connect-4 in which the game theoretical value is known and based on logic since Connect-4 is relatively simple. It will be interesting to see for which size of Connect-4 grid the algorithms and the model can perform efficiently and whether a drawn state can be reached or whether one algorithm is severely outperforming another.

## Literature

For literature I have selected two papers based on AI for Connect-4 which are focusing primarily on the application of algorithms. Ideally in the final project something related to game theory will be added as well.

## References

Lorenz, U. (2004, September). Beyond optimal play in two-person-zerosum games. In *European Symposium on Algorithms* (pp. 749-759). Springer, Berlin, Heidelberg.

Kang, X., Wang, Y., & Hu, Y. (2019). Research on different heuristics for minimax algorithm insight from connect-4 game. *Journal of Intelligent Learning Systems and Applications*, 11(02), 15.