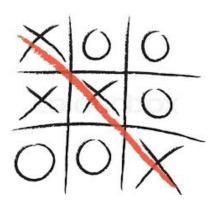# Tic-Tac-Toe AI

Machine Learning - MSc DMDS - EM Lyon

Year 2020-2021

1   Introduction

Tic-Tac-Toe is a paper-and-pencil game for two players, X and O, who take turns marking the spaces in a 3×3 grid. The player who succeeds in placing three of their marks in a diagonal, horizontal, or vertical row is the winner. It is a solved game with a forced draw assuming best play from both players.

In this project, the creation of an Artificial Intelligence (AI), that would decide what is the next best move, is proposed.

2   Objectives / Tasks

The objective of the project is to determine the next action that your Machine Learning AI would do in the game. Obviously, the objective of your AI is to evaluate the impact of choosing a particular square over its probability to win the game. Therefore, the first task of this project is to build the game using Python. A tutorial for this is available here:

https://techvidvan.com/tutorials/python-game-project-tic-tac-toe/

However, if you do not like this tutorial, you are free to choose another one.

The second task of this project is to give your machine learning algorithm a way to assess its performance. Because we are making a game where you can either win or loose, the probability of winning might be a good factor. You will have to create a way to obtain a training dataset from which your machine learning algorithm will learn which decision is the best for next turn according to statistics.

The third task will be to train a machine learning model, which would analyze the dataset and predict the next move of the CPU player. You will have to prove the validity of your model.

The fourth task is to prepare a presentation of your results. This implies making visuals to explain your results. You will have 15 to 20 minutes to show the result of your work.

3   Grading

The grade of your project will be determined by the teacher after your presentation. There will be no individual grade for members of the same team, unless there are clear disparity in the effort that was put. The four different task will each represent 25% of the final grade.