

CS6380 - Artificial Intelligence

Assignment #3

Ultimate Tic-Tac-Toe

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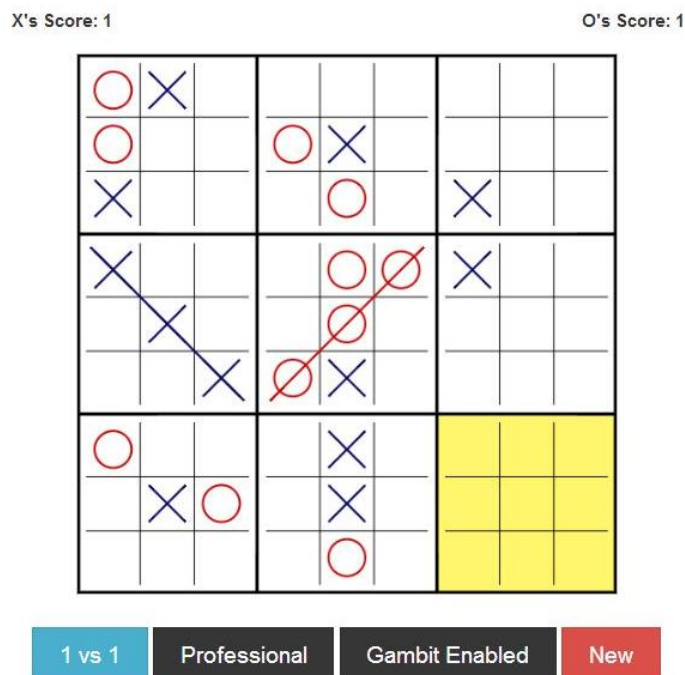
1 Introduction

Our assignment was to develop a specific game software. We chose the recently popular game of Ultimate Tic Tac Toe, which features a large Tic Tac Toe game, in which there is a conventional Tic Tac Toe grid inside each square. A detailed explanation of the rules, with illustrations, can be found [here](#).

2 The software

2.1 Frontend

The frontend has been designed using the HTML5 Canvas interface, which is one of the best looking web-based interfaces there is. To draw the lines, and to handle events, we wrote a few basic JavaScript functions. For the layout and design of the page, we used [Twitter Bootstrap](#), which simplifies this process and produces great looking HTML interfaces. A screenshot of a game-in-progress:



2.2 Backend

Users can choose to play against each other, or against the AI. These options are manipulated by the buttons. When the AI option is selected, every move of the user is sent as an AJAX GET request, along with all the parameters including selected options, state of the board, and the sub-board where the AI must play. The backend server, which is written in Python using the [Django](#) framework, then processes the arguments, and returns the AI's move. There are three difficulty levels currently set for the AI - Amateur, Professional and Legendary. Amateur is a random bot, to help people who are playing the game for the first time to find their feet. Professional uses an evaluation function with no lookahead, while Legendary uses the same evaluation function, but computes the minimax value over a few moves. The reason that a server is being involved at all, instead of making the whole app client-side, is to leave open the possibility of expanding it to a service that allows users to play each other from different computers.

3 File organisation

To understand the code, a basic understanding of the control flow in a Django project is required. The TicTacToe.js file can be found in the static/js directory. This sets up the initial page, with the lines drawn for the blank board, and default settings. The user can then modify his setting and click anywhere to start playing. When the AI is set on, after every user move, the JavaScript code sends an AJAX GET request. This is received in the GetMove() function in UTTTApp/views.py. This function basically processes the arguments it receives from the frontend and dispatches calls to the other functions. The control flow is explained in detail in the comments.