

The Tic Tac Toe Computer

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Abstract:

Donald Miche created a match box computer that can learn and improve at tic tac toe which comprises of 304 match boxes; however that is an extreme amount and even then it can't play second I aim to fix this by creating a much more optimum version of this tic tac toe computer which is less bulky and can play both second and first. One method of achieving this may be by creating a book with every possible outcome that is more compact or by perhaps by using a bigger box that can contain more beads that correspond to slots on the board; hence, allowing the computer to be more compact while also allowing it to play with itself and s both player one and two; Another Method is by creating a beads and box compute similar to MENACE but the box is smaller and therefore can fit more beads allowing for many less boxes and a much more probabilistic computer. These two methods are both less tedious to make, a lot more compact, and simplistic. This Matchbox engine can play entirely probabilistically while being more compact and simple.

Introduction

Tic tac toe has 255,168 possible games of which only 31,996 unique games of tic tac toe mainly because many games being either rotated orientations or mirrored versions of other games; And of those games only 6,956 games consist of of players actually trying to win the game instead of the other possibilities in which both players are actively not making winning movies despite them being there. By continuously reducing these possibilities Donald Miche created MENACE (Machine Educable Noughts And Crosses Engine) In 1961 in an aim to master noughts and crosses or tic tac toe. This computer consisted of 304 matchboxes with small holes which contained beads- each color corresponded to a spot on the tic tac toe grid. On shaking a bead would fall out corresponding to the spot the computer would play. Upon playing, if the computer won the match it would get rewarded by getting another bead of the same color that emerged put in the corresponding matchbox therefore increasing the probability of that bead being expelled from the match box the next time that specific match box is shaken; However if the computer lost it would loses the losing bed hence pushing it by reducing the probability of the losing move being played again. After hundreds of games MENACE would improve, and eventually reach perfect play and consistently win every game or perhaps tie.

However this computer is too bulky, very complex to set up, and cannot play second.

To fix these problems there are two methods which are able to play tic tac toe and be more compact.

Tic Tac Tome

Tic tac tome is a book written by Willy Yonkers which has a tic tac toe board on the first page with numbers in each of the playable slots; these numbers correspond to the page the player must flip to if they decide to play a move in that position. Then after flipping to the page that corresponds to that position they will see another tic tac toe board with now a X placed that the slot the player moved and an O placed

where the book moved and again numbers in each of the remaining slots which corresponded to the page the player must go to if they decide to play a move in that position. This process would repeat until a draw occurs or until either the book or the player won. Likewise if one opened the back cover of the book they would see an O already placed and again numbers that correspond to the page the player must flip to if they decide to play a move in that position. This book is written in almost perfect play, meaning that it will win or draw all games it plays except for a single precise game in which the book loses. This book is much more compact and simple than MENACE; however it cannot learn and improve. Instead it is already at a nearly peak performance which causes it to have fewer applications than MENACE.

APEX

APEX (Altruistic Probabilistic Engine for X's and O's) is a box and beads computer similar to MENACE that I, Ishmeet Singh created for Tic Tac Toe. The computer I made consists of a somewhat small box with a hole the size of a bead, nine beads which can loosely fit in said box, and a special tic tac toe board with colored slots each of which correspond to the color of a bead. Similar to MENACE, on shaking one bead will fall out; that bead corresponds to the move made by the computer and on the player's turn they will move to any non occupied slot and remove a bead that has the color corresponding to that slot. This process will repeat until draw occurs or until either the player or computer wins. APEX is much more compact and arguably simpler than both Tic Tac Tome and MENACE; However unlike both MENACE and Tic Tac Tome, APEX can never achieve perfect play or anything close to it since it can never learn. As the name suggests, It will always remain entirely probabilistic and therefore has more applications than tic tac tome and maybe even more applications than MENACE.

Conclusion

Tic Tac Tome and APEX are both autonomous players of tic tac toe but unlike the original tic tac toe matchbox computer MENACE, They are both more compact, simplistic, and much less tedious to make while also being able to play first and/or second; however both either have the only aspect of near perfect play or only probabilistic outcomes neither has both nor can either learn and improve, but they both are a much more accessible and portable alternative for the average person

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