**Strategy for Minimizing Shots in Battleship**

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1. INTRODUCTION

Battleship is a game that involves a great degree of chance. Regardless of the random nature of the game, patterns can be found to improve performance and increase the odds of winning a match. Ship placement can be tailored based on expected hit areas of the other player, and ship targeting can be influenced by the number of unexplored cells surrounding each cell to improve the performance of an AI.

For ship placement, a simple learning algorithm can be used to decrease the chances of an AI player’s ship being hit. At the end of every game, the AI records the locations of the cells that its enemy targeted on its board, and saves it to a frequency table. The table contains the amount of times each cell has been hit. The AI uses this chart, and places ships in the cells with the minimum values. (THIS CAN BE FURTHER ENHANCED TO DO ROWS/COLUMNS WITH MINIMUM VALUE, CAPSING THIS SO I REMEMBER TO CHANGE IT IF IM ABLE TO GET IT WORKING). This strategy can result in the AI taking less hits over a period of time.

One strong strategy for targeting in Battleship is to use a strafing pattern based on a number of subgrids of the battleship board [1]. Within these subgrids, values can be assigned to each cell based on the frequency of a specific ship appearing there. These values are used to create a strafing pattern for searching for ships, and the pattern is specific to each size of ship being looked for. Due to the minimum size of a ship being two cells long, it is also beneficial to choose to only target even or odd cells while searching for a ship.

1. MAIN RESULTS
2. CONCLUSION

While Battleship is frequently seen as a game of chance, strategies can be used to increase the odds of winning a game.

Figure 1. Graph displaying the number of total turns for two AI agents with various methods. Data for each column is based on 1000 games.

REFERENCES:

[1] E. Y. Rodin, J. Cowley, K. Huck, S. Payne, and D. Politte, “Developing a strategy for ‘battleship,’” *Mathematical and Computer Modelling*, vol. 10, no. 2, pp. 146–151, 1988.

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