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Checkers: the Implementation of Knowledge-Based Artificial Intelligence in Game Playing

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ABSTRACT

"The purpose of education is to replace an empty mind with an open one."
Malcolm Forbes, Collection by C. Leslie Carpenter

The implementation of Artificial Intelligence in Checkers game shows that the elaboration of the implemented strategy through the use of evaluation functions holds an equivalent importance with the algorithms as the concepts behind heuristic theory. The project opts for Checkers due to its ideality in the exploration process because checkers-playing computer has been a proof of machine mimicking human's intelligence, which nevertheless has not been solved completely yet due to the complexity of unpredictable opponent's moves. This project is of high importance because the success of the future works could help human beings to learn more about themselves; especially towards the perplexity of strategy making that is indeed unfussy for the nature of computer.

The fact that this product is still a game, which in common users' concern is solely to play with, brings up the hurdle to balance the need to incorporate technical aspects without distracting the reality of the product as an entertainment media. This is solved by controlling the gaming variables, such as technical jargons and features used, based on the requirements gathered through questionnaires. Moreover, the complexity in realizing the ideas in the form of codes is solved through the experimental process that begins with analyzing closely three application programs in different programming languages and ends up with studying the field data for the actual product in the form of rules. Analytic model is directly implemented in the form of prototype that undergoes iterations.

The resulting product is of moderate intelligence, which is still non-comparable to the world contenders programs. Though it is able to defeat novice users in 7 games out of 10 trials, nevertheless experienced users are able to win in average of 8 out of 10 games in around 5 minutes time. Regardless of the fact that the intelligence level might not be better than two of the analyzed applications, however the response time manages to be reduced amazingly to 50 ms/move for 2-ply search depth and 67.5 ms/move in 6-ply search depth.

These results imply that this project is in tolerance towards the project’s aim since developer, and readers hopefully, have gained thorough understanding of the problem in hand. This project could be potentially further generalized through the understanding of basic algorithms and sophisticated evaluation functions, accompanied by future work of powerful end game database, good funding and proper time space. It suggests that any artificial intelligentsia could potentially improve the implementation of Checkers game to aim for a machine that involves intuition and mimics human’s abstraction in the thinking process.