ABSTRACT

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MINMAX ALGORITHM IMPLEMENTATION WITH ALPHA BETA PRUNING ON GOMOKU10 GAME
(xiv + 116 pages; 49 pictures; 19 tables)

Gomoku10 Game is a Game that uses a board with alternating X and O symbols until it fills the 10x10 board. Player who can make the 5 X or O symbols horizontally, vertically, or diagonally wins the Game. Artificial intelligence in Games Gomoku10 initially only utilizes the rule based, which still felt to be less than effective. Keeping the rule based as the fundamental of the heuristic function, the artificial intelligence of the Game Gomoku10 is also increased using the MinMax Algorithm with Alpha Beta Pruning. In addition, the search for the best value is also performed using several variations of value for the heuristic function on rule based to Help the artificial intelligence take the best moves in the Game.

The artificial intelligence layout of the Gomoku10 is made of two parts, which are rule based and heuristic function. Rule based or production rules which is used in the Game Gomoku10 consists of three rules, namely Winning Line, In Line Nodes, and Connection Nodes. Production rules will yield a heuristic function in which the results will be applied to the MinMax algorithm with Alpha Beta Pruning. Tested has been conducted on the software and the artificial intelligence of the Game Gomoku10. The software testing includes functional and behavioral testing, while the artificial intelligence testing includes variation, depth, and statistical testing using Kruskal Wallis Test.

After testing is done, several things can be concluded. The more depth or depth search on MinMax algorithm, the better results are given. The best variation for depth 3 with Winning Line=7, In Line Nodes=3, and Connection Nodes=1. The Gomoku10 Game winning rate on depth 3 is 18%, while on depth 4 it is 68%. The computation time of the computer in taking used depth-influenced steps and the number of decision tree must be evaluated.

Reference : 11 (1994 – 2012).