ABSTRACT

Santa fe Trail is genetic programming exercise in which artificial Ant search for food pellet that is spread forming pathway.[6] The purpose of this case is to find instructions for giving ant an order to take all of the food pellets. Total of the food pellets is 89. The Challenge of this case is food that is all of food pellets is not fully connected. There is some obstacles including L pathway and missing pathway with varying length.

Grammar Evolution is used to resolve this case. GE is one of Evolution Algorithm. GE use a grammar to get a solution. With this grammar GE is easy to be implemented to any case. There is duplication process that will add chromosome's length. With this process GE can find solution with flexible chromosome length.

Experiments used three layout. Layout1 is layout standart for santa fe trail. Layout1 used to test how well the solution can be achieved and analyze the influence of the roulette wheel and tournament selection. On layout2, food is truncated by one step; on layout3, food is truncated by two step; layout4 is same as layout1, but at some point some food is erased.

The best step that can be achieved on layout1 with grammar1 is 461 step, while the best step with grammar2 is 405 step. Solution can't be founded while use layout2, layout3 and layout4. Makimum food can be founded is 43 of 48 (layout2), 28 of 48 (layout3) and 50 of 75 (layout4).

Keyword : *Evolution algorithm, Grammatical Evolution, Santa fe Trail.*