

## **ABSTRACT**

*Concerned weather information, especially rainfall, gives lots of advantages into several lives' activities, just as in the agriculturals, forestry, fisheries, and other sectors. Initially, the seasonal changes were predictable. But nowadays, as the result of Global Warming phenomenon, seasonal changes are no longer easy to predict. Whereas by doing predictions, it can give you the ideas about future events which is closest to reality.*

*On this final project research, Artificial Neural Network (ANN) is used in predicting the rainfall. However, the ANN algorithm has weaknesses in determining the architecture and the good weight of ANN, and in order to get the architecture and good weight of ANN so the Differential Evolution (DE) will be optimizing the ANN algorithm. DE algorithm raises the number of individual with representation of real and integer. Then, each individual is encoded into an architecture and fully connected ANN weight. Each individual will generates the fitness value by doing the advanced calculations of ANN. Individual who has the highest fitness value will be the best individual. Each individual in a population will go through the mutation differential process and recombination. So one individual will produces one population. The selections of individual that will go into the next generation occur in the process called Survivor Selection.*

*The optimization of DE algorithm to ANN produces the prediction with the amount of accuracy 85.4% in predicting the rainfall within 12 months. The result of prediction is obtained from the evaluation of 200.000 individual with the average 89.1% of training accuracy and 90.7% of testing.*

*Keywords: prediction, rainfall, differential evolution, artificial neural network*