

ABSTRACT

Malaria is an endemic disease in most of Indonesian area, especially in rural and remote areas. Banggai, one of regencies in Central Sulawesi province, is a high endemic area of malaria with Annual Parasite Incidence (API) in 2010 reached 7.88%. The incidence and spreading of malaria were influenced by environmental and weather factors, particularly rainfall and temperature. Therefore this study would like to developed a malaria incidence prediction system based on environmental and weather factors, so that it may assist Indonesian Ministry of Health to control malaria. The method used to solve the problem was Evolving Neural Network (ENN). This method was a mixture between Artificial Neural Network (ANN) and Genetic Algorithm (GA).

The result of this study shows that the prediction system has acceptable performance for predicting malaria incidence based on weather factors. The best performance while predicting malaria incidence in 2008 was MAPE 21.3%, accuracy 75%, and F-value 84.21%. The best season to predict was dry season with MAPE 13.18%, accuracy 100%, and F-value 100%. As for predicting malaria incidence in 2009, was resulted MAPE 15.29%, accuracy 75%, and F-value 40%. The best season to predict was rainy season with MAPE 3.1%, accuracy 100%, and F-value 100%. These findings proved that there was a sufficient correlation between weather and malaria incidence.

ENN reduced trial-and-error process in constructing ANN architecture very significantly. The reduction was up to 96%. ENN also improved the performance of ANN up to 14.84% in MAPE, 25% in accuracy, and 40% in F-value.

Keywords: Malaria, Prediction, Evolving Neural Network, Artificial Neural Network, Genetic Algorithm