ABSTRACT

The artificial neural network (ANN) technology in rainfall prediction can be done using the learning approach. The ANN prediction accuracy is measured by the determination coefficient (R2) and root mean square error (RMSE). This research implements Elman's Recurrent ANN which is heuristically optimized based on el-nino southern oscilation (ENSO) variables: wind, southern oscillation index (SOI), sea surface temperature (SST) dan outgoing long wave radiation (OLR) to forecast regional monthly rainfall in Bongan Bali. The heuristic learning optimization done is basically a performance development of standard gradient descent learning algorithm into training algorithms: gradient descent momentum and adaptive learning rate. The patterns of input data affect the performance of Recurrent Elman neural network in estimation process. The first data group that is 75% training data and 25% testing data produce the maximum R2 leap 74,6% while the second data group that is 50% training data and 50% testing data produce the maximum R2 leap 49,8%.

***Keywords**: artificial neural network, coefficient deteminationi (R2), root mean square error (RMSE), gradient descent adaptive learning rate and momentum, ENSO.*

ABSTRAK

Teknologi artificial intellegence, khususnya jaringan syaraf tiruan (JST), dapat dilakukan dalam pendugaan curah hujan dengan metode pendekatan pembelajaran. Keakuratan hasil prediksi JST diukur berdasarkan koefisien determinasi (R2) dan root mean square error (RMSE). Penelitian ini menerapkan JST Recurrent Elman yang teroptimasi secara heuristik untuk pendugaan curah hujan berdasarkan peubah el-nino southern oscilation (ENSO): angin, southern oscillation index (SOI), sea surface temperatur (SST) dan outgoing long wave radiation (OLR) dengan studi kasus daerah Bongan Bali. Optimasi pembelajaran heuristik yang dilakukan pada dasarnya adalah pengembangan kinerja algoritma pembelajaran gradient descent standar menjadi algoritma pelatihan, yaitu gradient descent adaptive learning rate and momentum. Pola input data yang digunakan sangat berpengaruh terhadap kinerja JST Recurrent Elman dalam proses pendugaan. Kelompok data pertama (75% data pelatihan dan 25% data uji) menghasilkan R2 maksimum 74,6% sedangkan kelompok data kedua (50% data pelatihan dan 50% data uji) menghasilkan R2 maksimum 49,8%.

***Kata kunci**: jaringan syaraf tiruan recurrent Elman, koefisien determinasi (R2), root mean square error (RMSE), ENSO, gradient descent adaptive learning rate and momentum*