MOMENTUM OPERATOR FOR HEURISTIC ALGORITHM FOR SCREENING TEST OF DIABETES MELLITUS BASED ON URINALYSIS

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ABSTRACT

Urinalysis using a dipstick is one of the simple methods for urine examination. However, interpretation of test results is still difficult to be understood by the user. In data mining, early diagnostic is always associated with classification. Artificial Neural Network (ANN) is a supervised learning algorithm which needs learning process. This process is used to find weight and bias for ANN. Therefore, there is need for a learning method to determine an optimal weight and bias. Moreover, Gravitational Search Algorithm (GSA) is a new heuristic algorithm which derives its inspiration from natural phenomenon. As a heuristic algorithm, GSA has a good performance in global searching. However, if premature convergence happens, GSA will stop and lose its ability to search. Therefore, a new operator that inspired by conservation of linear momentum is added to improve GSA’s performance by exploring the solution.

In this thesis, a new heuristic algorithm named GSA–Momentum (GSAM) is proposed. It is a GSA with a momentum operator. It is used in this thesis as learning method in ANN for hyperglycemia screening test, which is an indicator of Diabetes Mellitus. Screening test is applied based on urinalysis result classification. The method will be simulated in MATLAB R2009a. In urine classification, we obtained accuracy 78.2%, sensitivity 66.5%, dan spesifisity 89.9% as the best result. The results show that the new operator takes effect in high dimension.

Keywords: Artificial Neural Network, Heuristic, Classification, Screening Test