Universiti Teknologi MARA

Prediction of Student Academic Performance Using Artificial Neural Network

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STUDENT'S DECLARATION

I certify that this report and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

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ABSTRACT

Predicting students' academic performance is something that every university needs to pay attention in order to produce high-quality students in all fields. If the campus makes initial preparations to detect students who have problems in their subjects, the students could be assisted through programs that specifically accommodate them with their weak subjects. This study was conducted to predict student academic performance using Artificial Neural Network (ANN). The forecast model is implemented using MATLAB R2020a. The dataset used was secondary data from 382 Mathematics students from UCI Machine Learning Repository Data Sets and was collected from 2005 to 2006 of the school year. In order to train the ANN model built using *nntool*, two inputs are used, which are first and second period grade while one target is used, which is final grade. This study also aims to identify which training function is the best among three Feed-Forward Neural Networks namely Network1, Network2 and Network3. There are three types of training functions that have been selected in this study, which are Levenberg-Marquardt backpropagation (TRAINLM), Gradient descent with momentum backpropagation (TRAINGDM) and Gradient descent with adaptive learning rate backpropagation (TRAINGDA). Each training function will be compared based on correlation coefficient, Mean Squared Error (MSE), epoch, gradient and time. The results show that the TRAINLM function was the most suitable function in the application of student academic prediction because it has a higher correlation coefficient and a lower Mean Squared Error (MSE) when compared to the other training functions. The highest value of correlation coefficient indicates that there is a strong positive relationship between target and output while the lowest MSE indicates a more accurate model.

Keywords: Student Academic Performance, Artificial Neural Network, Training Functions

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