

ARTIFICIAL NEURAL NETWORKS IN PREDICTING STUDENTS PERFORMANCE IN ENGLISH

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Анотація

У статті розглядається використання моделей штучної нейронної мережі для вирішення проблем прогнозування, класифікації, моніторингу та управління в різних галузях науки та техніки.

Ключові слова: штучна нейронна мережа, змінні, вхід, вихід, алгоритм, оцінка.

Abstract

The article considers the use of Artificial Neural Network models to solve the problems of prediction, classification, monitoring and management in different fields of science and engineering.

Keywords: Artificial Neural Network, variables, input, output, algorithm, score.

Introduction

Neural networks have been of a great interest over the last decades and are being successfully applied in such areas as finance, medicine, engineering and education to solve the problems of prediction, classification or control. Neural networks are applicable in every situation in which a relationship between the predictor variables (inputs) and predicted variables (outputs) exists. They are introduced in detection of medical phenomena, stock market prediction, credit assignment, monitoring the condition of machinery and engine management.

An Artificial Neural Network (ANN) is an arithmetical model that is motivated by the organization and/or functional feature of biological neural networks. A neural network contains an interrelated set of artificial neurons, and it processes information using a connectionist form to computation. As a general rule an ANN is an adaptive system that adjusts its structure based on external or internal information that runs through the network during the learning process. Recent neural networks are non-linear numerical data modeling tools. They are usually used to model intricate relationships among inputs and outputs or to uncover patterns in data. ANN has been applied in numerous applications with considerable attainment [4-5].

Once you have decided on a problem to solve using neural networks, you will need to gather data for training purposes. The training data set includes a number of cases, each containing values for a range of input and output variables. The first decisions you will need to make are: which variables to use, and how many cases to gather.

Artificial Neural Networks seems appropriate to be used in science and engineering, in education, in particular. The main objective of the student performance prediction system is to determine students who would be expected do well in English. It should be noted that this module of predicting student performance will help in identifying which student possibly will succeed in studying programs.

They suggest research seeking to explore the possibility of using an Artificial Neural Network model to predict the performance of a student before he/she starts his/her study year.

A number of factors that are considered to have an effect on the students performance are to be outlined. These factors should be studied and synchronized into a convenient number appropriate for computer coding within the environment of the ANN modeling. These factors are classified as input variables. The output variables embody some likely levels of performance of a student in terms of university grading system.

The input variables may be:

1. High school score.
2. Results in English in high school.
3. Results in English in university entrance examination.
4. Results in English in Independent External Evaluation.
5. Number of credits to be taken by a student in freshman year.

6. Type of high school (with advanced English courses or without).
7. Location of high school, etc.

The Neural Network is then trained used one of the supervised learning algorithms, which uses the data to adjust the network's weights and thresholds so as to minimize the error in its predictions on the training set. If the network is properly trained, it has then learned to model the (unknown) function that relates the input variables to the output variables, and can be used to make prediction where the output is not known.

An artificial Neural Network model for predicating student performance can use feed forward backpropagation algorithm for training. The factors for the model are obtained from student registration records. The model can be tested with the overall result up to 80%. Thus, it shows the potential of the artificial neural network for predicating student performance.

Conclusion

ANNs are composed of artificial neurons which retain the biological concept of neurons, which receive input, combine the input with their internal state (activation) and an optional threshold using an activation function, and produce output using an output function. The initial inputs are external data, such as images and documents. The ultimate outputs accomplish the task, such as recognizing an object in an image. ANNs provide an analytical alternative to conventional techniques which are often limited by strict assumptions of normality, linearity, variable independence etc. Because an ANN can capture many kinds of relationships it allows the user to quickly and relatively easily model phenomena which otherwise may have been very difficult or impossible to explain otherwise.

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