**PREDICTING STUDENTS ACADEMIC PERFORMANCE USING ARTIFICIAL NEURAL NETWORK**

**INTRODUCTION**  
**1.1   BACKGROUND TO THE STUDY**  
Predicting student academic performance has long been an important research topic. Among the issues of education system, questions concerning admissions into academic institutions (secondary and tertiary level) remain important (Ting, 2008). The main objective of the admission system is to determine the candidates who would likely perform well after being accepted into the school. The quality of admitted students has a great influence on the level of academic performance, research and training within the institution. The failure to perform an accurate admission decision may result in an unsuitable student being admitted to the program. Hence, admission officers want to know more about the academic potential of each student. Accurate predictions help admission officers to distinguish between suitable and unsuitable candidates for an academic program, and identify candidates who would likely do well in the school (Ayan and Garcia, 2013). The results obtained from the prediction of academic performance may be used for classifying students, which enables educational managers to offer them additional support, such as customized assistance and tutoring resources.

The results of this prediction can also be used by instructors to specify the most suitable teaching actions for each group of students, and provide them with further assistance tailored to their needs. In addition, the prediction results may help students develop a good understanding of how well or how poorly they would perform, and then develop a suitable learning strategy. Accurate prediction of student achievement is one way to enhance the quality of education and provide better educational services (Romero and Ventura, 2007). Different approaches have been applied to predicting student academic performance, including traditional mathematical models and modern data mining techniques. In these approaches, a set of mathematical formulas was used to describe the quantitative relationships between outputs and inputs (*i.e.*, predictor variables). The prediction is accurate if the error between the predicted and actual values is within a small range.

In machine learning and cognitive science, artificial neural networks (ANNs) are a family of statistical learning models inspired by biological neural networks (the central nervous systems of animals, in particular the brain) and are used to estimate or approximate functions that can depend on a large number of inputs and are generally unknown. Artificial neural networks are generally presented as systems of interconnected "neurons" which exchange messages between each other. The connections have numeric weights that can be tuned based on experience, making neural nets adaptive to inputs and capable of learning. For example, a neural network for handwriting recognition is defined by a set of input neurons which may be activated by the pixels of an input image. After being weighted and transformed by a function (determined by the network's designer), the activations of these neurons are then passed on to other neurons. This process is repeated until finally, an output neuron is activated. This determines which character was read.

The artificial neural network (ANN), a soft computing technique, has been successfully applied in different fields of science, such as pattern recognition, fault diagnosis, forecasting and prediction. However, as far as we are aware, not much research on predicting student academic performance takes advantage of artificial neural network. Kanakana and Olanrewaju (2001) utilized a multilayer perception neural network to predict student performance. They used the average point scores of grade 12 students as inputs and the first year college results as output. The research showed that an artificial neural network based model is able to predict student performance in the first semester with high accuracy. A multiple feed-forward neural network was proposed to predict the students’ final achievement and to classify them into two groups. In their work, a student achievement prediction method was applied to a 10-week course. The results showed that accurate prediction is possible at an early stage, and more specifically at the third week of the 10-week course.

**1.2 STATEMENT OF THE PROBLEM**  
The observed poor academic performance of some Nigerian students (tertiary and secondary) in recent times has been partly traced to inadequacies of the National University Admission Examination System. It has become obvious that the present process is not adequate for selecting potentially good students. Hence there is the need to improve on the sophistication of the entire system in order to preserve the high integrity and quality. It should be noted that this feeling of uneasiness of stakeholders about the traditional admission system, which is not peculiar to Nigeria, has been an age long and global problem. Kenneth Mellamby (1956) observed that universities worldwide are not really satisfied by the methods used for selecting undergraduates. While admission processes in many developed countries has benefited from, and has been enhanced by, various advances in information science and technology, the Nigerian system has yet to take full advantage of these new tools and technology. Hence this study takes an scientific approach to tackling the problem of admissions by seeking ways to make the process more effective and efficient. Specifically the study seeks to explore the possibility of using an Artificial Neural Network model to predict the performance of a student before admitting the student.

**1.3   OBJECTIVES OF THE STUDY**  
The following are the objectives of this study:

1. To examine the use of Artificial Neural Network in predicting students academic performance.
2. To examine the mode of operation of Artificial Neural Network.
3. To identify other approaches of predicting students academic performance.

**1.4   SIGNIFICANCE OF THE STUDY**

This study will educate on the design and implementation of Artificial Neural Network. It will also educate on how Artificial Neural Network can be used in predicting students academic performance.  
This research will also serve as a resource base to other scholars and researchers interested in carrying out further research in this field subsequently, if applied will go to an extent to provide new explanation to the topic

**1.6   SCOPE/LIMITATIONS OF THE STUDY**  
This study will cover the mode of operation of Artificial Neural Network and how it can be used to predict student academic performance.

**LIMITATION OF STUDY**  
**Financial constraint**- Insufficient fund tends to impede the efficiency of the researcher in sourcing for the relevant materials, literature or information and in the process of data collection (internet, questionnaire and interview).  
**Time constraint**- The researcher will simultaneously engage in this study with other academic work. This consequently will cut down on the time devoted for the research work.

**REFERENCES**  
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