A Study on "Role on Neuro-Fuzzy System in Students Academic Performance"

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ABSTRACT

This paper survey on neuro-fuzzy system in Student academic performance using classification and literature review over the last (2006-2017).The main Function of this analysis is to support the development Of Intelligent Planning System (INPLANS) using Fuzzy Systems, Neural Networks. Which will be used by the Academic Advisory Domain In educational institutions by evaluating and predicting students' performance.

Keywords: Decision Support System, Fuzzy Logic, Neural Network, Student academic performance.

I. INTRODUCTION

Education is a process which accepts students from a Low level of standing, pushes them through several stages of development. Accurately predicting student testing performance is useful in many different contexts in educational environments. Since the character of an educational foundation is primarily reflected in its research, training and the excellent students affect the character level of the testing method. Accurate prediction enables educational managers to improve student testing performance by providing students additional funding such as customized help and instruction resources. The answers of the prediction can also be used by lecturers to set the most suitable teaching actions for each group of pupils and cater them with further assistance tailored to their demands. Therefore, perfect prediction of student achievement is one path to heighten quality and provide better testing services. As a consequence, the ability to predict student testing performance is important for educational establishments.

II. LITERATURE REVIEW

Neuro-Fuzzy systems are one of the most successful and visible directions of that effort. Some reviews are:
1) In 1981,Walberg specified a model for educational productivity in which nine factors were identified that promote student learning.
2) In 1954, The university of New Zealand council for educational research investigated the relationship between academic standards of students.
3) Osman talon, provide an adoptive neuro-Fuzzy model for prediction of students' academic performances.

Neuro-Fuzzy systems are efficient and effective methods to analyse the uncertainty in education.

III. METHODOLOGY

Neuro-Fuzzy system refer to combination of artificial of neural network in the field of artificial intelligence. It continues with discussions on the architecture of hybrid learning and fuzzy model validation, the error of observations for training data. It is to strengthen the student academic by providing additional information for decision making and a better results for a student's achievement and also to perform a evaluation of the academic performances.

IV. CLASSIFICATION

The main research themes, trends, challenges/issues, and results of that field are classified in the tables:
 i. Table 1: Students Academic performances
 ii. Table 2: Summary of work done in successive years
The tabulated information were explained in detail using seven Ws (**W**ho, **W**hat, **W**hen, **W**here, **W**hy, for **W**hom, ho**W**).

V. SCOPE FOR FURTHER RESEARCH

Further development in student academic performance in neuro-Fuzzy is different fuzzification and defuzzification strategies with different rule base structures can be investigate to effectively model a student. And also various other machine learning algorithms should be implement on student performance in this study. Neuro-Fuzzy system the model may prove to play a significant role in testing the prediction of students. The findings prompted us to further investigate how core courses affects in engineering and compare their sensitivity effect on student academic performance will be good upon graduation.

VI. CONCLUSION

Several reasons for predicting the academic performance of students' are studied and a prediction model has been proposed using Fuzzy Probabilistic Neural Network. The model may prove to play a significant role in academics by Predicting the level of students in the class and by providing an insight to the teacher to better plan the lectures Depending on student's level. As a result, the teacher can also maintain a balance between the quality and quantity of Knowledge to be imparted in class. From the institution's viewpoint, an early prediction lends a hand in identifying Inabilities of the students, taking timely measures to improve them, thereby locking in the students.

Author/years	Methodology	Domain	Article type	Further research
Iraji et/2012	ANFIS, LVQ Rules	Student classification	Simulation	Implementation of Clustering algorithm
F. K. Nauck and R. Kruse	Neuro-Fuzzy systems	Student classification	Simulation	Determine the initial parameters of the system
James R. Nolan	Fuzzy classification	Grading of student writing	Analytical	Training system with different objective functions
Braai S. V &Nair R. S	Neuro-Fuzzy models	Student classification	Analytical	Integration of proposed model with a web based on intelligent tutoring system
B. Ranjith/1995	Application of hybrid systems and sets	Student evaluation	Simulation	Applicability of evaluation procedure can further be extended
Stathopoulos/2003	Neuro-Fuzzy approach	Student diagnosis	Simulation	Different parameters and structural features of proposed diagnostic process is necessary
S. Russell/2003	Artificial intelligence	Student classification	Analytical	Intelligent planning system should be able to generate for student academic performance
Liao S. H/1995-2004	Method for students evaluating using fuzzy sets	Student evaluation	Analytical	Fuzzy data analysis to discover rules in large set if data
Kooks. B/1992	Neural networks fuzzy systems	Student classification	Simulation	Different types of neural networks considered
Noureldin/2007	Optimizing neuro-Fuzzy	Student evaluation	Simulation	Neuro-Fuzzy systems can improve the output of student academic performance

TABLE 2: SUMMARY OF WORK DONE IN SUCCESSIVE YEARS

Years	Summary of Paper review
2006	Several approaches using fuzzy techniques have been proposed to provide a practical method for evaluating student academic performance. However, these approaches are largely based on expert opinions and are difficult to explore and utilize valuable information embedded in collected data. This paper proposes a new method for evaluating student academic performance based on data-driven fuzzy rule induction.
2009	A systematic approach for the design of a fuzzy inference system (FIS) based on a class of neural networks to assess the students' performance. Fuzzy systems have reached a recognized success in several applications to solve diverse class of problem
2012	In this article, we have tried to design an intelligent system which can separate and classify student according to learning factor and performance. a system is proposed through Lvq networks methods, anfis method to separate these student on learning factor.
2013	Classifying the student academic performance with high accuracy facilitates admission decisions and enhances educational services at educational institutions. The purpose of this paper is to present a neuro-fuzzy approach for classifying students into different groups. The neuro-fuzzy classifier used previous exam results and other related factors as input variables and labeled students based on their expected academic performance.
2013	The paper presents a Neural Network model for modeling academic profile of students. The proposed model allows prediction of students' academic performance based on some of their qualitative observations.
2015	This work explores the prediction of students' success in campus interview. It allows prediction of students acquired knowledge based on more or less of their qualitative observations of the writing test and viva model. Sorting out and predicting students acquired knowledge using arithmetic and statistical techniques may not necessarily provide the best means to assess the knowledge and skills.
2015	Students are required to choose a certain number of elective courses for next semester. One of the factors influencing the course selection of the students is their grade in the course. The grades that students will get from the course at the end of the semester depend on many factors and includes uncertainties.
2017	This work developed a Neuro-Fuzzy model as an intelligent computational framework to provide decision support for the admission of candidates into Higher Institutions. The traditional admission process is based on Unified Tertiary Matriculation Examination (UTME) and Post- Unified Tertiary Matriculation Examination (Post-UTME) scores, so long as the O-Level requirements are satisfied
2017	This paper discusses the findings of a case study that uses neuro-fuzzy tool to classify and predict Electrical engineering students graduation achievement based on mathematics competency. In this study, achievement upon graduation and mathematics grades were classified as the key performance index.
2020	Data mining is being increasingly leveraged in educational settings for achieving various different outcomes including students' learning patterns, course and teaching outcome assessment, and students' expected achievement prediction.

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DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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