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Using Artificial Neural Networks to Predict Student Stumbling at Najran University

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***Abstract*— The research is concerned with the application of the artificial neural network system, which simulate the neural networks in the human organism, That centered around the designing of neurons that dedicated functions enable us to create a smart neural network through repeated training to reach results providing time and effort to the community , The sampling used in this research are students who expected to stumble . The study is conducted to use a new method to enable predicting the stumbling before it occur by sorting and processing the inputs to produce a list of expected stumbling students border to solve their problems by calculating their progress and cumulative GPA rates.**

Keywords*: *Artificial neural network system, ANN, Predict.

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I. INTRODUCTION

The research focuses on the low achievers of the students which are the most important university's inputs. The research aims to find a sophisticated method that goes with the latest technological developments, This method is the neural networks The basic component of the study follows the students grades through their progress rates during the monthly tests, in addition to their cumulative rates and the number of warnings, the previous variables are treated as the neural network input with specific conditions to predict the stumbling students before they stumbled.

II. LITERATURE SURVEY

1-Early and dynamic student achievement prediction in e-learning courses using neural networks[1] The increasing number of students in e-learning has led to the need for accurate mechanisms to predict student achievement .According to this issue teachers improve the efficiency of their courses to meet the specific needs of their students at an early stage. In this paper, the student's prediction method is presented in the e-learning course for 10 weeks. This research uses advanced neural networks to predict the final students achievement dynamically and group them into two hypothetical groups, depending on their performance. Multi-choice test scores are used as input data set for networks. This type of test was preferred to its objectivity. The results showed that accurate prediction is possible at an early stage, specifically in the third week. In addition, when the students were assembled, low displacement rates showed the adequacy of the approach. The results of the proposed method were compared with those of linear regression, and the neural network approach was found to be more effective at all stages of prediction. The proposed methodology is expected to support trainers in providing better educational services as well as customized assistance according to the expected level of the students performance .

2- hybrid data envelopment analysis approach to analyze college graduation rate at higher education institutions [2] College graduation rates have become a primary focus in measuring institutional performance and accountability in higher education. In 2009, President Obama set a goal for the United States to have the highest proportion of college graduates in the world by 2020. With the heightened focus on transparency and accountability in higher education today, university administrators are developing internal strategies to improve graduation rates. In fact, it is not only significantly important to institutions, but also to individuals and to the nation as a whole to increase college graduation rates. In this paper, a hybrid data envelopment analysis (DEA) approach is implemented for the very same purpose by combining with the cross industry standard process for data mining (CRISP-DM) methodology. The approach is illustrated by a case study at a U.S.based four-year public university. We identify the most important predictors of graduation which help improve graduation rates by the CRISP-DM method. It shows that Fall term grade point average (GPA), Housing status, High school and Spring term GPA were the four highest determinative factors while monetary variables and the ethnic background of the student were revealed to be the least important ones. The results also indicated that students living on campus were more likely to complete within six years. For the detailed improvement strategies for increasing college graduation rate, we use the

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hybrid DEA methodology (an input-oriented bounded-and-discrete-data DEA model and context-dependent DEA) to evaluate the performance of college undergraduate students. These analyses provide potentially useful information and policy support for university administrators**.**

3-A Micro-
expression Recognition Algorithm for Students in Classro om Learning Based on Convolutional Neural Network.[3] strategy and improve the teaching effect based on the expression and learning state of each student. This paper mainly develops a micro-expression recognition algorithm for students in classroom learning, based on convolutional **neural network** (CNN) and automatic face detection. Specifically, the multitask deep convolution **network** (DNN) was adopted to detect the landmark points of human face, and a hybrid DNN was designed to extract the optical-flow features of micro-expression. The extracted features were improved through redundancy removal and dimensionality reduction. The rationality of our algorithm was proved through a comparative experiment on real-world databases and an application in classroom teaching. The research results provide a new direction for applying deep learning in face recognition.
4- Training Neural Networks Usinig Reduced Training Sets[4] Artificial Neural Network (ANN) may require long training time. Deciding when to stop the learning algorithm is a crucial issue, too much training causes over fitting, however too little training would not be enough to obtain good classification accuracy. In this work, we investigate the effect of applying instance-reduction techniques on training sets before we use them to train neural networks. The hope is by doing so, we would be able reduce the training time without substantially decreasing the classification accuracy and at the same time reduce the effect of noise in the training sets. We also investigate the effect of using the reduced set as a validation set, to decide when to stop training. Our experiments show that using instance reduction techniques have positive effect on the classification accuracy in the presence of noise in the training set. Our results also show that reduced training set serve as good validation sets.

III. RESEARCH METHODOLOGY

The first stage: building the neural network in terms of choice of the type of networks , the number of layers , the selection of weights and other things, through the designing of diagrams linking input to the output through processes that correspond to the structure of the network.
The first stage was completed through three steps:
1.Classification type.
2. Revenue determination (Xi), Yi (Yi) and weights (Wi).
3.Choose an activation function.
4.Building a neural network.
Stage 2: Training the neural network through the matlab2010 program
The second stage is done in two steps Learning Rate Neural Networks Training steps.

IV. EXPERIMENTAL ANALYSIS

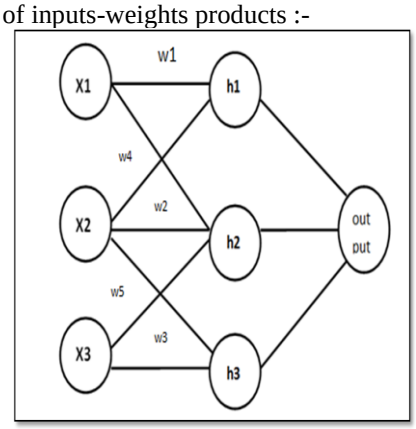
4.1.Neural Network Training:
4.1.1weights Initialization

Conventional (W_i)	W_1= First month grades 10/2=5 Degrees	W_2=Second month grades 10/2=5 Degrees	W_3=work of the year 10/2=5 Degrees
Neural Network($w_{i*0.1}$)	0.5	0.5	0.5

4.2 Inputs Application:-

Conventional(Xi)	X1= First month grades for student	X2=Second month grades for student	X3=work of the year for student
Neural Network(xi*0.1)	e.g X=2 0.2	e.g X= 5 0.5	e.g X=1 0.1

4.3 Sum of inputs-weights products :-



calculate the total net input for h1(net h1= x1*w1+x2*w2+x3*w3+b1*1,

= 0.2*0.5 +0.5*0.5+0.1*0.5+0.32*1=0.52)

using the logistic function to get the output of h1:

(out h1=$\frac{1}{1+e^{-net\,h_1}}$ = $\frac{1}{1+e^{-0.52}}$ = 0.6271478)

*Repeat operations for h2,h3 .

4.4 Calculating the Total Error :-
(Sum of Squared Errors (SSE) is the function which needs to be minimized. SSE is a squared difference of calculated outcomes and true class labels)

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$$Etotal = \sum \frac{1}{2} (target-output)2.$$

V.THE RESULTS

Subject	Training error	Test error	Activation function	Neural Network result	Conventional result
Computer programming-1	0.013278	0.0004756	signum activation functions	21.3%	20.0%

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