

An Expert System to Predict Readiness of a Student for Campus Placements Using Neural Networks

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Abstract: Many of the students that are getting graduated from many universities across the globe have one goal, to get placed in a company after their graduation. Job placements are getting also getting difficult day by day as there are a number of people getting graduated every year. It is not only that but also most of the students are getting good grades in the examinations but are not actually gaining knowledge. But the real difficulty comes when they are not recruited into any of the companies. They keep on attending for a new company for recruitment drives and they won't get placed. Doing this repeatedly does nothing but consumption of time. Instead, they can get some training to get the necessary skill set that is desired by the recruiter. The model proposed in this research paper helps students to know their vulnerable areas and makes the work of recruiter easier. This model also helps the student to know which category they belong, Such that they try to improve themselves. Every student is categorized into three categories namely Ready for the placement, Need Practice, Need Training. Using Neural can change the results in the system drastically, as neural networks search in every single way for getting the necessary combination of the attributes and which in turn will lead us in the right path and also simplifies most of the things.

This system is all about guiding a student and help possibly every individual to get placed in a job after their graduation.

Index Terms: Career Assessment, Student Placement, Student Category, Skill Based Classification, Career Assessment.

I. INTRODUCTION

1.1 Career Assessment :

How to assess a student's career? We generally use IQ to be a measure of intelligence. But what exactly is IQ?. Most people do not know the definition for that. IQ stands for intelligence quotient. But often referred to as cognitive intelligence. Career Assessment can be done in a lot of ways. But the classic way of doing this is on the basis of the marks that they get in the subjects or the courses that they learn. In this expert system, we took the factors as the marks of important subjects or courses.

1.2 Artificial Neural Networks :

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Artificial networks play a major part in the smart systems and all the automated machines, as all the smart systems and automated systems work on Artificial Intelligence, and Artificial Neural Networks Are must be employed there. ANNs are basically designed by observing the brains of the living beings, and how every input in the brain gets processed by going through all the interconnected neurons and the output as a whole will be opted as output.

ANNs basically have three layers: Input Layer, Hidden Layer, Output Layer

Input Layer: As the name suggests input layer takes in the input and passes it to the next layer in the artificial neural network that is a hidden layer.

Hidden layer: Hidden layer is the next layer to the input layer, most of the work done by the artificial neural network is done here.

This layer will have many hidden layers in which we have neurons interconnected with each other and then gives the appropriate result to the output to the next layer that is the output layer.

The output and the calculation here is done basically by the interconnected neurons, if the obtained output is not the desired result then we can just change the weights between the neurons that are interconnected.

This will matter a lot, as the weights between the neurons mean that the change of the intensity of the attributes in the input.

Output Layer:

Output layer gives out the output.

Terminology:

1.Attributes: Characteristic of data

Ex: take a car as an example. The characteristics of a car are

Color/Type / Shape

Specifications

2.Factors input: Taking the data set as input and the features will be the attributed that affect the inputs

Ex: consider a data set of Blood pressure patients the features will be

*Age

*Food Habits

*Daily Routine

3.Input vector: Input vector set is the set containing the inputs and the attributes that we provide as input.

4.Sample: a part of the data that is considered

1.3 Applications of Artificial Neural Networks:

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1. System Identification: System identification is like giving a mathematical function to the dynamic behavior of the system and all the sorts of the type that are used in all the computer automated systems these days

2. Game Recognition: Gameplay requires a lot of complex decisions than most others if we take a game and give the ANNs a dataset that has both inputs and outputs it will automatically understand the rules and the outcomes of the inputs.

1.4 Expert System:

An expert system is a group of working functions that successfully complete a work with minimal errors as which means it is an expert system, just like an expert in a field.

II. LITERATURE SURVEY

[1] We Career planning is one of the most important parts of any students life, this particular phase should be dealing with a lot of care and importance. Once if the student does not understand his mistakes then he will be no longer be able to correct them. One of the main advantages of this expert system is to identify at what place he is in the competition for the job and by this he/she will improve themselves and get better and get hired.

[2] Samy Abu Naser and Ihab Zaqout of Al-Azhar University et al. [1] developed an expert system that predicts the performance of students based on their first year's grades of important subjects. They used Feed Forward Back Propagation network with a accuracy of 84.6%.

[3] Budi Rahmani and Hugo Aprilianto of STMIK Banjarbaru et al. [2] developed a system that predicts 99.9% accurately which uses back propagation in neural networks with assistance of NNtool.

[4] Alfred Essa and Hanan Ayad of Desire2Learn Inc, Kitchener, Canada et al. [3] designed a system, S3 and with the help of it they predict the students at risk enabling them to improve themselves before it is too late for them.

[5] Mack Sweeney and Huzefa Rangwala of George Mason University et al. [4] developed a recommender system that uses hybrid FM-RF to predict the grades of a student that is either currently studying or a new student and also recommends them appropriate way to get good grades.

[6] Dr. Abdullah Al-Ghamdi and Sumaia Al-Ghuribi of King Abdulaziz University et al. [5] used Wxpython and programmed a system called PAS, that recommends a student which postgraduation programme he should choose. This system acts just like career suggesting experts and also shown great results.

[7] Ajay Kumar Pal and Saurabh Pal et al. [6] concluded that Naive Bayes approach is 86.1% accurate and has 0.28 lowest error average for predicting student's chance of getting placed after graduating from MCA programme.

[8] Stamos T. Karamouzis and Andreas Vrettos et al. [7] used backpropagation to predict the dropouts from the school in order to increase the number of graduates. They used backpropagation Artificial Neural Networks and predicted 72% correctly.

[9] Anal Acharya and Devadatta Sinha et al. [8] used F-measure and Kappa statistics to identify weak students based on their marks such that they might get some sort of remediation and can be improved in their academics.

[10] V.Chandra Prakash and J. K. R. Sastry of K L Educational Foundation et al. [9] designed a system that will predict the student's speed of learning and problem solving

by making the student play tic-tac-toe game thereby assessing their psychological factors like intelligence.

III. SKILL-BASED CLASSIFICATION

Students are to be classified based on the skill based on the individual's marks in specific courses. In this model, we like to introduce a new way by which the students are categorized into three categories namely Ready for the placement, Need Practice, Need Training.

The required mark for each of the category is as follows: Ready for the placement ---- Greater than or equal to 59 percentage.

Need Practice ---- Greater than or equal to 39 and less than 58 Percentage. Need Training ---- Less than 38 percent.

These percentage is calculated by the marks that they obtain in some of the main subjects of computer science domain such as C, C++, Java, Database management system etc.,

This method of the classification not only shows the student his position in the competition but also helps to improve him in various ways. For example, if a student is in category "Need Training" it is waste of time for him to attend any clearance screening tests of some company recruitment, instead of this they can get trained in specific subjects and make better future. And if the student is in "Ready for the Industry" they will get a lot of confidence that can actually help him in getting placed in better companies, as we all know that a lot of intelligent people get tensed and lose a lot of good opportunities. This gives that kind of people the required amount of confidence that is required for him. If the student is in "Need practice" he will get support such that he won't give up when he is don't get selected in the recruitment drives instead he will try to improve because he will get a hope that he can do well if he just concentrates a bit more.

3.2 Impact on Software Industry:

This system can have a lot of impact on Software Industry, as it will change a lot by making only the students with the right and required knowledge to get placed. By this, the quality of the software products that get out of the company gets improved thereby increasing the value of the company. Not only that but also the recruiter's job easy and more accurate.

IV . THE WORKING SYSTEM:

The scores of the subjects C& C++, OOPS, DBMS, Data Structures, DAA, OS, English are taken in order to calculate the average percentage of the student as these subjects are required for the profession of a software engineer. All this data is of continues form. We took the data of students of KL Educational Foundation Final year students list and prepared a live working model.

The scaling method used is Mean Standard Deviation, which is basically dispersion statistic.

It is calculated as square root of variance. Which mean that the Standard deviation is directly proportional to area occupied by the data.

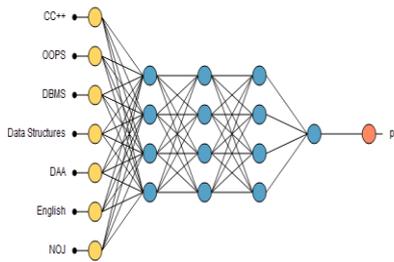
Neural structure used is three layers with 4 neurons each, activation function of each layer is logistic which gave the best results out of the previously performed combinations. Probabilistic method used is probability with a threshold rate of 0.90.

Error method used is Weighted Squared Error. Training algorithm is Quasi newton method with maximum iterations 1000. Quasi newton returns Global minimum of a individual in a given space.

Order selection algorithm is Simulated Annealing, which is an algorithm that deals with the optimization which gives global optimized values.

Input selection method used is Genetic algorithm which is used to find the search heuristic to find the fittest one out of the given space.

Neural Network Design:



Inputs

Input values		
Name	Value	
1	CC++	57.5
2	OOPS	55
3	DBMS	61.5
4	Data Structures	48.5
5	DAA	32
6	English	53
7	NOJ	0

OK Cancel

Untrained output 1:

5.2 Inputs-outputs table
The next table shows the input values and their corresponding output values. The input variables are CC++, OOPS, DBMS, Data Structures, DAA, English and NOJ, and the output variable is pr.

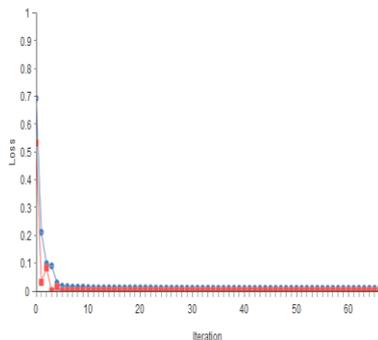
	Value
CC++	57.5
OOPS	55
DBMS	61.5
Data Structures	48.5
DAA	32
English	53
NOJ	0
pr	0.166044882

Expected output: 0, obtained output 0.1

The feedback that is obtained from the neural designer after the training and testing is as follows:

	Value
Final parameters norm	8.51
Final loss	0.00931
Final selection loss	0.000624
Final gradient norm	6.06e-008
Iterations number	66
Elapsed time	00:00
Stopping criterion	Minimum parameters increment norm

The graph plotted between the loss and iteration is given as :



Final selection loss is 0.0006 and final loss is 0.0093, number of iterations is 66.

The error is minimal but we still wanted to test it in the real time instead of the values that we got on paper. So the trained intelligent system is tested with unknown data and the output is accurate:

Untrained Input 1:

Inputs

Input values		
Name	Value	
1	CC++	91
2	OOPS	88
3	DBMS	86
4	Data Structures	79
5	DAA	87
6	English	90
7	NOJ	2

OK Cancel

Untrained input 2:

Untrained output 2: Pr: 0.952, expected output 1.

V. CONCLUSION

We hereby conclude that this system will actually help a lot of students in achieving their dreams in their careers, in the above unknown data 2 the system predicted that the student with that scores might get placed in a company soon after the graduation, it predicted true compared to the actual value. The same goes with the unknown input 1, the system predicted that with that grades it is not possible for a student to get placed in a company, and it returned the same. This is a very important system in every student's life as it will show in which position they are in and whether they will get placed after the graduation or not.



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