

Conversion of Uncertainty to Certainty model using Soft computing techniques.

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Abstract. The global world demands best fit nature of its subsystems at given interval time. Due to this nature it is really challenging task to any teacher irrespective of their orbit to prepare their students as per demands of international market. So it is always advisable to all teachers prepare the class notes on the basis of optimum solution instead of just feasible solution. In class room all types of students are available as per universal truth. So slow learners are also one of the major factor to estimate the overall performance of class room. In this context the authors are emphasis on role of slow learners on over all performance of class with respect to different modes(Regular, Distance and Online) of Education System with respect to critical thinking.

Keywords: Types of students ,Critical nature, Slow Learners and technical tools.

1 Introduction

The word critical thinking has different logical meaning when it context is differ from one to other. Even though we have different meanings the global concept of critical thinking is get the best thinking or logic to get the solution as per given constraints. The real time data is always differs from historical data. All the stakeholders generally satisfy when they can get expected service(students, customers, patients etc). But it is not sure this critical thinking may or may not support the quality of data(Data mining philosophy).

Performance analysis is general term for evaluate the success process to get more good result for next attempt or iteration. It also have its own cost.In general tradition the system can fix some interval of time to evaluate its performance by its subsystems. The word soft computing is technical domain which consists of Fuzzy logic, Neural Networks and Data mining technologies. Now a days the Hybrid of these technologies can also lead the soft computing which is mainly useful for conversion of mathematical models into real world applications.

1.1 Different parameters of Higher Education System

As defined in abstract the real world need the best fit students for the existence of real market it is necessary to take all preventive and recovery actions for failure of students in particular or general accept. There are lot of factors which effects the students for successfully completion of course at any level. Generally at any level the important factors are mode and teachers. But when the world became small village due to IT innovation and reforms the gap between failure and success are gradually reduced. It is highly meaningful to use the Probabilistic methods and other Mathematical methods(Permutations and Combinations) to find out the exact or near by solution for failures which are far or very far from objective solution. In the new era of Technology Distance and Online became mandatory to full fill the objectives of course work.

The authors emphasis on only the developed countries and India as a unit for scope the study and then hence comparative study also feasible between two types of systems. The developed countries have very strict documentation and policy for different modes and developing countries are still search for their feasibility of different parameters in the Distance and Online Education system. The major factor in developing countries is Ministry is depend on different autonomous bodies in an Education System. When different autonomous bodies are available then the bounded solution may become un bounded solution and hence it needs more iterations for getting the solution. Subsequent paragraphs, however, are indented .Recently the UGC(University Grants Commission) had exempted the IGNOU(Indira Gandhi National Open University) and execute the document of IGNOU for conducting the online courses.

In general the class room or any unit area consists of different types of student's namely top middle and low level which are fit for success of an event. Even though the parameters are same throughout the world, the existence conditions are different i.e. developed or developing or under developed countries. The failure students in developed countries may get success in developing or developed countries but vice versa is not true.

Literature Review. The authors only emphasis on three parameters in global education system due to scope the paper and had been chosen one popular technical tool for simulation studies. The authors preferred the both Artificial Intelligence and Data mining tools for technical feasibility [1].

In real time application it is very difficult to discover the major facts of system even though sometimes they are available directly. For instance the Decision making System cannot construct without expert system. Since only experts can take a decision. Once again it is always not true since the decision is completely depend upon the context (In this case cost of the factor or resource)[2].

As already mentioned in Introduction the Probabilistic and Mathematical models are the best ways to tackle this critical thinking students and slow learner students. Before

the implementation of this critical value and slow learner it is good practice to fix the values as threshold values for reduce the iterations during the implementation of course of action. The authors observed that there are different contexts are available for meaning for critical thinking and slow learners.[3].

It is very difficult to give the exact meaning of critical thinking. Since it is context based and depend upon the either closed or open system or domain based[4].But the overall concept of critical thinking is take dynamic decision for getting the best solution without disturbing the given constraints.

The authors considered the most popular ten ranks of developed countries Universities as a sample size for study and research purpose. It is observed that the high intelligence and knowledge is depend on individuals but not on geographical or social factors. But if we have good resources it is possible to improve our skills.[5]. A willingness (a predisposition) and an ability to scrutinize and evaluate thinking – one’s own, as well as others’ – in order to determine truth, accuracy, or worth, and to construct logical arguments to justify claims or assertions - Beyer (1990)[6]. Since the definition of slow learners is completely depend upon the intelligent and know ledge with compare to age and range of expected out puts. Even though it is very difficult to estimate the real thinking nature of students since academics are generally instruction based instead of intelligence based. A good teacher can get very good results with the students of average intelligence. Sometimes it is necessary a perfect guidelines for intelligent students to achieve the minimum expected outcomes. So thinking skill is more dominate when the context exists. The above average student also cannot get the outcome if he/she did not think properly. So the normal thinking nature is itself acts as critical thinking as per context.[7]

Critical thinking is sometimes works as science where logic is matter or vital factor. Since the real world problems based on run time environment and need logical flow of control to take perfect decision. But vice versa is not possible since scientific decision only needs intelligence but decision under risk cannot satisfy the constraints of general case.(Deniz Kalkon),[8].

The author aims to respond various questions regarding the role of Critical Thinking in Science Education from aspects concerning the importance or relevance of critical thinking in science education, the situation in the classroom and curriculum, and the conception of critical thinking and fostering in science education. This review is specially addressed to educational contexts (teachers) where Critical thinking has had a very few presence in Science Education, particularly in the classroom. The findings and discussion of this review explain the relevance and strong relationship between Critical thinking and science education [9].

Problem Solving and Critical Thinking Everyone experiences problems from time to time. Some of our problems are big and complicated, while others may be more easily solved. There is no shortage of challenges and issues that can arise on the job. Whether in an office or on a construction site, experiencing difficulties with the tasks at hand or with coworkers, the workplace presents ongoing challenges on a daily basis.

Whether these problems are large or small, they need to be dealt with constructively and fairly. Having the necessary skills to identify solutions to problems is one of the skills that employers look for in employees(pg-98)[10]

The author asked the children to determine what to do with these rich nutrients. By taking a vote it was decided that the vermin compost would be harvested and scattered in our local park to give back to the community. We would also use some of the vermin compost in the classroom to help the plants grow.(p-10).In this context the author tried to estimate the original knowledge of students on the basis of academics.[11]

Managers and leaders of all levels need to ensure that the best decisions are taken, problems are solved in the optimum way, and the creative ideas and innovations so necessary for tomorrow's business flow freely. Decision Making and Problem Solving Strategies will help you to master the processes of practical thinking which lie behind effective decision making, problem solving and creative thinking. Using checklists, exercises and case studies it explains key concepts such as: how the mind works, the principles of effective thinking, how to develop a framework for decision making, how to use a simple model for making decisions and solving problems, how to sharpen up creative thinking skills and how to develop their thinking skills in the future[12].

Ennis (2016) lists 14 philosophically oriented scholarly definitions and three dictionary definitions. Following Rawls (1971), who distinguished his conception of justice from a utilitarian conception but regarded them as rival conceptions of the same concept, Ennis maintains that the 17 definitions are different conceptions of the same concept. Rawls articulated the shared concept of justice as a characteristic set of principles for assigning basic rights and duties and for determining... the proper distribution of the benefits and burdens of social cooperation. (Rawls 1971: 5)

Bailin et al. (1999b) claim that, if one considers what sorts of thinking an educator would take not to be critical thinking and what sorts to be critical thinking, one can conclude that educators typically understand critical thinking to have at least three features and they are purpose of thinking, engaging of thinking, trying to fulfill standards, relevant standards.

A slow learner is a child of below average intelligence, whose thinking skills have developed significantly more slowly than the norm for his/her age. This child will go through the same basic developmental stages as other children, but will do so at a significantly slower rate. However, this development, while being slower, nevertheless be relatively even. On the other hand, a child with specific learning disability, is one of average or above average intelligence who has specific difficulties which can make learning very difficult. There may be deficits in any of the basic central nervous system functions, which have to do with the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities ie attention, memory, language, auditory and visual perception, motor coordination and planning, spatial orientation, impulse control and sequencing. In short, if there is a discrepancy between the child's potential and actual achievement[13]

The authors Tansely and Gulliford(1960) used the term 'slow learner' has been used in reference to students who are failing in their school work.In 1964 Dept of Education, UK used to indicate the failure of students to do minimum work commonly done by at the same age students and then the word slow learner is substituted with 'backwardness'. The author A.A.Williams(1970) accept the term 'slow learner' with condition that they have limited intelligence.[14]

It is a known fact that all children experience school-related problems at one time or another during their school years. A teacher on any working day may have to deal with problems ranging from aggressive behavior to disinterest in the learning task. The cause of such difficulties may vary from an unknown conflict at home to simple headache. Such situations may result in poor academic performance and aggressive behavior temporarily. Effective teachers tackle such problems easily. There is, however, another group of children who display prolonged learning difficulties. These are the children whose scholastic performance is below the average expected of their age-group. Most teachers who deal with average and below-average pupils meet children who do not seem to profit from the usual educational methods and content provided. The term 'backward' or 'slow learner' is reserved for these children who are not coping with the work normally expected of their age group (Bun, 1937) or whose scholastic performance is below the average expected of their age group (Kirman, 1975)[15].

For Kirk (1962), rate of learning is the basis of identifying a child as slow learner, average or gifted. For Kirk, the slow-learning child is not considered mentally retarded because he is capable of achieving a moderate degree of academic success even though at a slower rate than the average child. He is educated in the regular classes without special provisions except an adaptation of the regular class program to fit his slower learning ability. At the adult level, he is usually self-supporting, independent and socially adjusted.

A Slow learner is a child their thinking skills have developed more slowly compared to the normal child for his/her age. This child will go through the same basic development stages as other children but their learning process will be in slower rate. Slow learner can also be due to specific learning disability such as Dyslexia, Dysgraphia, and Dyspraxia etc. E-Learning in general, overcomes the limitations of time, budget, distance and resources faced by both public and private schools. E-Learning delivers the qualities of ordinary textbooks and exercise books and transfers them into digital content filled with multimedia, animations, visual stimulations and a creative delivery of various information, so as to provide the children with the motivation required to remember and learn the information.(P 53-61)[16]

Results and Discussion using different tools). The authors prepare the data on the basis of critical thinking and slow learners. There are lot of factors are available which influence the result such as teacher performance, student performance , time period, mode of delivery, nature of subject, individual Intelligent quotient(IQ),technical awareness, student's subject interest etc. The following Table 1 gives a prepared data for the experiment.

Table 1. Table Shows the performance of students after the critical thinking. (Sample data)

Student Id	Batch1	Batch2
CA-3A-CD-01	5	11
CS-3A-CD-02	7	16.5
CS-3A-CD-03	15	16
CS-3A-CD-04	17	21
CS-3A-CD-05	17.5	22.5

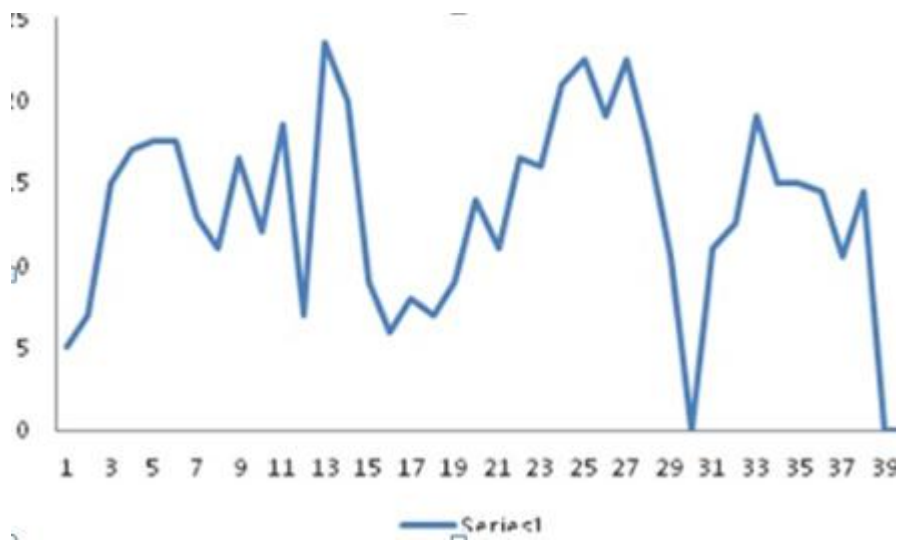


Fig.1. Shows the dataset original linear curve

The data is loaded into excel sheet as supervised learning with the critical thinking of input data for three records out of 40 records. These three records are very near to minimum value from 1 to 2 marks for 30% of final marks.

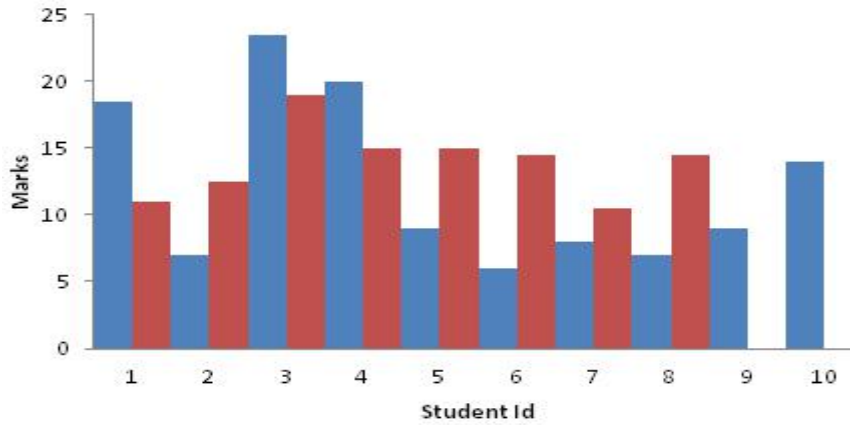


Fig.2. Shows the dataset have lot variation between two groups

The figure 2 represents there is lot of gap between group1 and group2 students and hence the critical decision did not show any effect on the overall of system.



Fig.3. Shows the dataset have lot variation between four groups

The authors repeat the experiment with four groups and from figure-3 it is observed that clusters have lot of variation from each other and hence it is very difficult to smooth the result or curve due to cluster values are very far from central value or point.

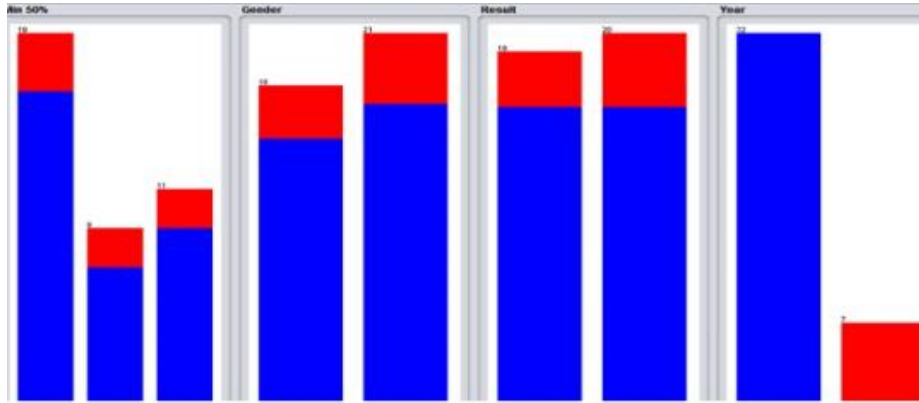


Fig.4. Shows the Weka dataset have lot variation between four groups.

From the figure-4 it is observed that the Fuzzy set supervised learning on the basis of Min pass Marks, Gender, Result, type(regular/backlog) students. From the above diagram it is noticed that all the events are almost very far and not even 60% and 40% and majority of them are 25% and 75% events occurring. For this type of data the critical thinking for performance enhancement for 1% or 2% are not effected on overall system.

=== Summary ===

Correctly Classified Instances	32	82.0513 %
Incorrectly Classified Instances	7	17.9487 %
Kappa statistic	0	
Mean absolute error	0.3023	
Root mean squared error	0.3833	
Relative absolute error	99.2484 %	
Root relative squared error	99.8034 %	
Total Number of Instances	39	

=== Confusion Matrix ===

```

a b  <-- classified as
32 0 | a = CURRENT
 7 0 | b = BACKLOG

```

Fig.5. Shows the Weka tool implementation shows only 82% is correct data.

From the above output it is observed that only 82% records correctly accessed and 18% are wrongly accessed and total 39 records are available. The critical method for

this data did not support for enhancement of students performance in examination. But one thing is all current and backlog student's records are exactly classified.

No.	Variable	Data Type	Input	Target	Risk	Ident	Ignore	Weight	Comment
1	Min.50.	Categoric	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unique: 3
2	Gender	Categoric	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unique: 2
3	Result	Categoric	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unique: 2
4	Year	Categoric	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unique: 2

Fig.6. Shows the data is successfully loaded into Rattle tool.

From the above diagram it is observed that all attributes category type and Result is set as target. Remaining fields are out of scope.

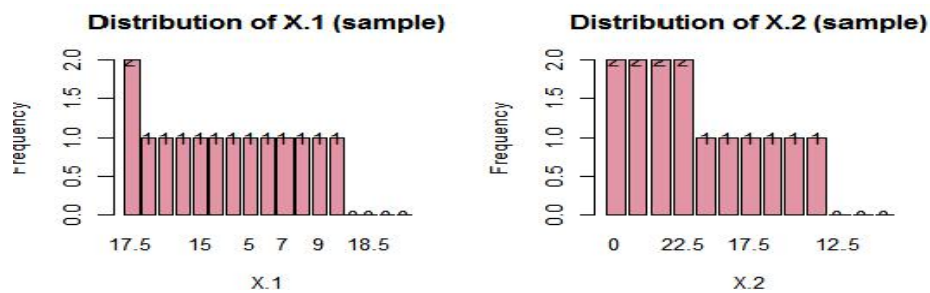


Fig.7. Shows the data is as two groups and minimum 50% of occurrence.

From the above diagram it is noticed that some events are occurred 50% and some events are occurred almost 100% after the data correction as critical data. The data like either 50% or 100% occurrence did not completely support by supervised methods. The event occurring 100% surely have error in the form of Fuzzy data.

Summary of the Neural Net model (built using nnet):

A 4-10-1 network with 65 weights.
 Inputs: Min.50.y, Min.50.Y, GenderG, ResultP.
 Output: as.factor(Year).
 Sum of Squares Residuals: 4.3071.

Neural Network build options: skip-layer connections; entropy fitting

In the following table:

- b represents the bias associated with a node
- h1 represents hidden layer node 1
- i1 represents input node 1 (i.e., input variable 1)
- o represents the output node

```

Weights for node o:
  b->o  h1->o  h2->o  h3->o  h4->o  h5->o  h6->o  h7->o  h8->o  h9->o  h10->o
  2.03   5.93   0.31   0.50  -0.04  -0.31  -0.39  -5.62   2.70  -11.89  14.03
  i1->o  i2->o  i3->o  i4->o
  -0.34   0.63  13.31  -0.28

Time taken: 0.04 secs

Rattle timestamp: 2020-01-31 12:15:03 MCA7
      Predicted
Actual  BACKLOG CURRENT Error
BACKLOG      0      1  100
CURRENT      0      4   0

Error matrix for the Neural Net model on Publication10.csv [validate] (proportions):
      Predicted
Actual  BACKLOG CURRENT Error
BACKLOG      0      20  100
CURRENT      0      80   0

Overall error: 20%, Averaged class error: 50%

Rattle timestamp: 2020-01-31 12:30:12 MCA7

```

Fig.7. Shows the data with Rattle, the confusion matrix shows 20% error

The authors modeled the above critical data with Neural Networks also. From the diagram and results it observed that at outer node (o) 50% of negative and 50% of positive values are available. The negative values at different nodes are not generated any output and hence iteration increases. The output shows 20% error as in the other tools like Weka and Excel.

Conclusion and future work

The authors are very slightly changed the data(using critical thinking) for 3 records out of 40 records sample then the different tools had been shown different error messages. Weka shows using approximately 18 % (17.9%) error and Rattle 3.6.3 shows 20% error. So our decision critical thinking should not holds good for a given data and there is no change in real data. Even the graphs are also favour to original data but not critical data. All graph values are very far from each other and hence critical data for enhance the performance of student is not allowed. The then critical thinking is used to increase the pass percentage of the student but not improve the quality of data. We can use the filters using Weka or any Data mining tool and repeat the sane process. It is also expected that we can use server side tools such as Oracle Data mining and Microsoft SQL Server and examine the difference between filters effect on critical thinking using client and server side Data mining or any suitable tools.

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