



Primary Education Analysis Based on Decision tree, Apriori Algorithm with Neural Networks

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Abstract: In this research work we have concentrate to measure the primary education status in Betul Dist. M.P India, It known that the literacy rate of Betul District is very slow and it is not the different in India. Here we measure the result rate of primary school III, IV and V at different classes at different Block of. Here we use Apriori algorithm to classify the data from irrelevant data and tertiary level data. After then we have applied Neural Network (Multilayer perceptron) to train the data set for better result. Finally we have compared the result by calculating the result with Decision tree. Here we found that if the previous result how to improve this result rate is small Neural Network is best to measure the result and NN generate effective result improvement facture rate is batter result .

Keywords: Decision Tree Algorithm, Neural Network, Apriori algorithm, Primary school, Association Mining.

I. Introduction

The development of any country depend s mainly on its manpower and the pillar of good manpower is the primary education. It is easy to realize that as the children are engaging to primary education as the hopes of the prosperity will go up for respective country. Kids learning are very important for every country irrespective of rich and poor. The countries which are more developed are developed at their education level and the development start from primary level. Basically kids are very much curious in every matter and those loves to adopt with innovative culture and fashion. To ensure the kids literacy governments as well as the parents should take effective measure which will attract the kids to learn with joy and enjoyments.

Proper education for the kids can empower human beings to liberate individual mind from the curse of ignorance and darkness. It represents the foundation in the development process of any society and the key indicator of the people's progress and prosperity.

In the view of the importance of education to a country like India the present thesis addresses limitations of primary education system, which is diversified and multifarious due to economic, socio cultural, political, regional and religious factors. The entrance of primary education is maintained mainly by the government of India. More than 73% schools are controlled by the government and around 82% of the total children enrolled in the primary level educational institution go to these schools (Baseline Survey, 2005:3). Similarly, more than 69% primary teachers are working in the government controlled schools. Besides government run primary schools, nine other category of primary schools are administered, monitored and maintained by different authorities. Disparity and lack of coordination among these institutions constrains the attainment of universal primary education and in its effort to increase enrollments and quality education. Variations in teacher student ratio, the number of qualified and trained teachers between the categories, also pose a big challenge towards achieving the goals of universal primary education.

In the circumstances of the open scenario, India became one of the signatories to the UN Millennium Declaration in 2000, and has achieved to eight Millennium Development Goals (MGDs) that affirmed a perception for the 21st century (Burns et al, 2003:23). Bangladesh also pledged to implement the MDGs roadmap by 2016. The MDG-2 targets for 'school Chalo Abhyan Universal Primary Education' are claimed to be on track in India, showing remarkable achievements in terms of net enrolment rate in primary education 72.7% in 1992 to 86% in 2005 and primary education completion 44.5% in 1992 to 85.3% in 2004 (Triumvir, 2005:120). India government itself had taken many initiatives, including the Compulsory Primary Education Act 1973, which made the five-year primary education program free in all primary school. The government adopted demand side intervention policies such as food for education program and stipend program for primary education. Of late, the government introduced primary education development program (PEDP-II), a Five year program beginning in the year 1983, which aims to increase access, quality and efficiency across the board in the primary education sector despite existing socioeconomic problems.

India by now has achieved a good progress in net enrollment rate and education completion rate in primary education. The current paper will examine the outcomes and challenges that have emerged as a result of Betul District. It would further investigate whether the target of the second Millennium Development Goal is attainable within the stipulated time.

To better improvement of literacy at primary level we examined and interviewed a lot of kids at various places and found that the children are used to learn with joy and entrainment. Recently in Betul District (M.P) various primary school at other country/Dist or state education system Strategy of like implemented school Chalo

Abhya at primary school compartment and get the very positive results.

In schools and constructing roads and provide Food at morning time Lunch is call Madhyan Bhojan because to give students easy access to schools and gat good Healthy food. Construction of 70 more is underway. It also paved 45 roads for easy access to schools for [3] students from nearby areas. About 78 more are under construction but Madhyan Bhojan facility is government provide is All over India and Betul Dist rural and Urban Area School. Any student a student of class-IV at Rural Area Village Government Primary School said she could not attend school in the rainy season last year for bad condition of the road to her school. But she has not missed any classes this year after the road got repaired. Head master of the Rural (Chakli Kala Multai Block) Area Govt. primary school said most students now come to school in the rainy season but the attendance hovered around 70-75 percent during the same period before the road was repaired. The children's School School Chalo Campaign. In this similar case private primary school in Urban and Rural area they do not provide any type of food faculty but school management provide some extra curriculum extra activity and motivate student all so his parents .

In the school is an additional attraction for students, he added. Several students were found waiting for their turn to get on a swing at M.P Government Primary School. Many of them come to school early to play on the swings. a student of class-V of Rural Area Government Primary School, said their playground used to go under water in the rainy season. It was developed last year, and now they can use it all year round, headmaster of Rural Area (Goradongri Block Amdana) govt primary school, said the Student initiative helped increase attendance rate in his school. Now about 93 to 97 percent students attend classes, while it was 80 to 85 percent a year ago. Rural Area (Multai Block Barai Village) [3] headmaster of Amla govt primary school, said the children's School Chalo Campaign of the school has brought a big change. The attendance rate went up to more than 90 percent from below 80 percent. Student said they are setting up children's School Chalo Campaign on school playgrounds to provide students with leisure facilities on instructions from School Had Master.

The organizations of the work start by the literature overview after the introductory descriptions. At the introductory description we have observed the situation of Betul District primary education and the current status of the country. At the literature study part we have look forward towards the whole world situations specially the developing courtiers of the world like. The data collection is done in all the block of Betul District at ruler and urban area private, Government school and semi govt. After the literature study and the data set are real world data from various primary school of Betul of Madhya Pradesh. It is very alarming that we have found very much irregularity to collect the data. Data collection helps us to design the intelligent system for our desired work. At first we applied the data classification techniques to the collected data. We choose decision tree and Apriori Algorithm in Association data set. The data set classification helps us to reduce the redundant data. At last but not the least we compare the result in Neural Network (Multilayer perceptron).

II. Literature Overview

[Ma, Liu, Wong, Yu, and Lee 2000] Applied a DM approach based in Association Rules in order to select weak tertiary school students of Singapore for remedial classes. The input variables included demographic attributes (e.g. sex, region) and school performance over the past years and the proposed solution outperformed the traditional allocation procedure. [Ma, Liu, Wong, Yu, and Lee .2000] they have applied a data mining technique based on association rules to find weak tertiary school students (n= 264) of Singapore for remedial classes. Three scoring measures namely Scoring Based on Associations (SBA-score), C4.5-score and NB-score for evaluating the prediction in connection with the selection of the students for remedial classes were used with the input variables like sex, region and school performance over the past years. It was found that the predictive accuracy of SBA-score methodology was 20% higher than that of C4.5 score, NB-score methods and traditional method.

[Y. B. Walters, and K. Soyibo 2001] they have conducted a study to determine Jamaican high school students' (population n=305) level of performance on five integrated science process skills with performance linked to gender, grade level, school location, school type, student type, and socio-economic background (SEB). The results revealed that there was a positive significant relationship between academic performance of the student and the nature of the school.

[Minaei-Bidgoli et al. 2003], online student grades from the Michigan State University were modeled using three classification approaches (i.e. binary: pass/fail; 3-level: low, middle, high; and 9-level: from 1- lowest grade to 9 - highest score). The database included 227 samples with online features (e.g. number of corrected answers or tries for homework) and the best results were obtained by a classifier ensemble (e.g. Decision Tree and Neural Network) with accuracy rates of 94% (binary), 72% (3-classes) and 62% (9- classes).

[Varapron P. et al. 2003] they have used Rough Set theory as a classification approach to analyze student data where the Rosetta toolkit was used to evaluate the student data to describe different dependencies between the attributes and the student status. The discovered patterns are explained in plain English.

[Kotsiantis et al.2004] Applied several DM algorithms to predict the performance of computer science students from university distance learning program. For each student, several demographic (e.g. sex, age, marital status)

and performance attributes (e.g. mark in a given assignment) were used as inputs of a binary pass/fail classifier. The best solution was obtained by a Naive Bayes method with an accuracy of 74%. Also, it was found that past school grades has a much higher impact than demographic variables

[Khan Z. N. Khan, 2005] he has conducted a performance study on 400 students comprising 200 boys and 200 girls selected from the senior secondary school of Aligarh Muslim University, Aligarh, India with a main objective to establish the prognostic value of different measures of cognition, personality and demographic variables for success at higher secondary level in science stream. The selection was based on cluster sampling technique in which the entire population of interest was divided into groups, or clusters, and a random sample of these clusters was selected for further analyses. It was found that girls with high socio-economic status had relatively higher academic achievement in science stream and boys with low socio-economic status had relatively higher academic achievement in general.

[Moriana . J. A. Moriana, F. Alos, R. Alcalá, M. J. Pino, J. Herruzo, and R. Ruiz, 2006] they have studied the possible influence of extra-curricular activities like study-related (tutoring or private classes, computers) and/or sports-related (indoor and outdoor games) on the academic performance of the secondary school students in Spain. A total number of 222 students from 12 different schools were the samples and they were categorized into two groups as a function of student activities (both sports and academic) outside the school day. Analysis of variance (ANOVA) was used to verify the effect of extracurricular activities on the academic performance and it was observed that group involved in activities outside the school yielded better academic performance.

[Pardos et al. 2006] Collected data from an online tutoring system regarding USA 8th grade Math tests. The authors adopted a regression approach, where the aim was to predict the math test score based on individual skills. The authors used Bayesian Networks and the best result was a predictive error of 15%.

[N.V. Anand Kumar, G.V. Uma 2009] they have conducted a study on the student performance by selecting a sample of 300 students (225 males, 75 females) from a group of colleges affiliated to Punjab University. The hypothesis that was stated as "Student's attitude towards attendance in class, hours spent in study on daily basis after college, students' family income, students' mother's age and mother's education are significantly related with student performance" was framed. By means of simple linear regression analysis, it was found that the factors like mother's education and student's family income were highly correlated with the student academic performance.

III. Decision tree

The philosophy of operation of any algorithm based on decision trees is quite simple. In fact, although sometimes containing important differences in the way to do this or that step, any algorithm of this category is based on the strategy of divide and conquers. In general, this philosophy is based on the successive division of the problem into several sub problems with a smaller number of dimensions, until a solution for each of the simpler problems can be found. Based on this principle, the classifiers based on decision trees try to find ways to divide the universe into successively more subgroups (creating nodes containing the respective tests) until each addressing only one class or until one of the classes shows a clear majority do not justifying further divisions, generating in this situation a leaf containing the class majority. Obviously, the classification is only to follow the path dictated by the successive test placed along the tree until it found a leaf containing the class to assign to the new example.

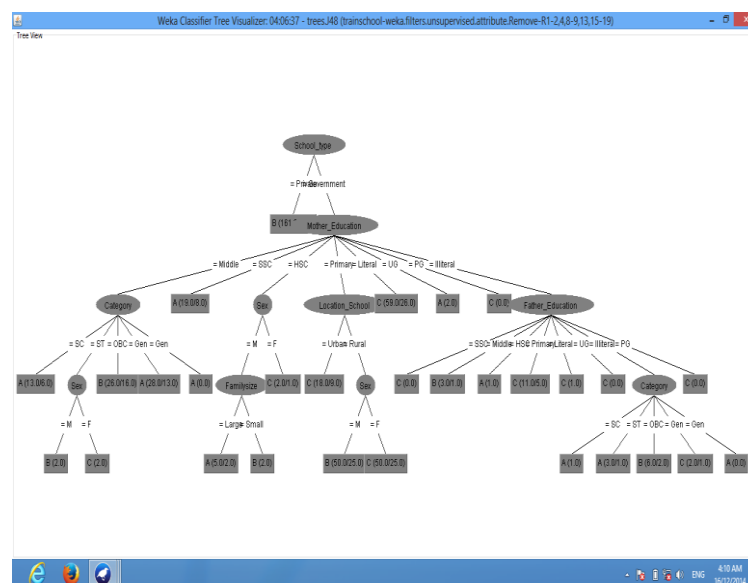


Figure 1: Decision Tree

We now need objective criteria for judging how good a split is. The information gain measure is used to select the test attribute at each node in the tree. The attribute with the highest information gain (or greatest entropy reduction) is chosen as the test attribute for the current node. This attribute minimizes the information needed to classify the samples in the resulting partitions.

Entropy, in general, measures the amount of disorder or uncertainty in a system. In the classification setting, higher entropy (i.e., more disorder) corresponds to a sample that has a mixed collection of labels. Lower entropy corresponds to a case where we have mostly pure partitions. In information theory, the entropy of a sample D is defined as follows:

$$H(D) = - \sum_{i=1}^k P(c_i|D) \log_2 P(c_i|D)$$

Where $P(c_i|D)$ is the probability of a data point in D being labeled with class c_i , and k is the number of classes. $P(c_i|D)$ can be estimated directly from the data as follows:

$$P(c_i|D) = \frac{|\{x_j \in D | x_j \text{ has label } y_j = c_i\}|}{|D|}$$

We can also define the weighted entropy of a decision/split as follows:

$$H(D_L, D_R) = \frac{|D_L|}{|D|} H(D_L) + \frac{|D_R|}{|D|} H(D_R)$$

Where D has been partitioned into D_L and D_R due to some split decision. Finally, we can define the information gain for a given split as:

$$Gain(D, D_L, D_R) = H(D) - H(D_L, D_R)$$

In other words, *Gain* is the expected reduction in entropy caused by knowing the value of an attribute

School_type = Private: B (161.0/64.0)

School_type = Government

| Mother_Education = Middle

| | Category = SC: A (13.0/6.0)

| | Category = ST

| | | Sex = M: B (2.0)

| | | Sex = F: C (2.0)

| | Category = OBC: B (26.0/16.0)

| | Category = Gen: A (28.0/13.0)

| | Category = Gen: A (0.0)

| Mother_Education = SSC: A (19.0/8.0)

| Mother_Education = HSC

| | Sex = M

| | | Familysize = Large: A (5.0/2.0)

| | | Familysize = Small: B (2.0)

| | Sex = F: C (2.0/1.0)

| Mother_Education = Primary

| | Location_School = Urban: C (18.0/9.0)

| | Location_School = Rural

| | | Sex = M: B (50.0/25.0)

| | | Sex = F: C (50.0/25.0)

| Mother_Education = Literal: C (59.0/26.0)

| Mother_Education = UG: A (2.0)

| Mother_Education = PG: C (0.0)

| Mother_Education = Illiteral

| | Father_Education = SSC: C (0.0)

| | Father_Education = Middle: B (3.0/1.0)

| | Father_Education = HSC: A (1.0)

| | Father_Education = Primary: C (11.0/5.0)

| | Father_Education = Literal: C (1.0)

| | Father_Education = UG: C (0.0)

| | Father_Education = Illiteral

| | | Category = SC: A (1.0)

| | | Category = ST: A (3.0/1.0)

| | | Category = OBC: B (6.0/2.0)

| | | Category = Gen: C (2.0/1.0)

| | | Category = Gen: A (0.0)

| | Father_Education = PG: C (0.0)

IV. Apriori Algorithm

- 1: Find all large 1-itemsets
 - 2: For ($k = 2$; while L_{k-1} is non-empty; $k++$)
 - 3 $\{C_k = \text{apriori-gen}(L_{k-1})$
 - 4 For each c in C_k , initialise $c.\text{count}$ to zero 5. For all records r in the DB
 - 6 $\{C_r = \text{subset}(C_k, r)$; For each c in C_r , $c.\text{count}++\}$
 - 5 Set $L_k :=$ all c in C_k whose $\text{count} \geq \text{minsup}$
 - 6 $\}/*$ end -- return all of the L_k sets
- We have gone to work out to *support* for each of the candidate k -itemises in C_k , by working out how many times each of these item sets appears in

ID	P_Grade(A)	Private	Rural	F_Govt	M_Govt	Fm_size4	Regular	OBC	Male
1	1	1		1			1	1	
2			1	1	1				
3		1	1			1			
4		1				1			1
5					1		1		
6						1			1
7	1			1				1	
8						1			1
9			1		1				
10		1					1		
11					1		1		
12	1								
13			1			1			
14			1			1			
15								1	1
16				1					
17	1					1			
18	1	1	1	1				1	
19	1	1		1			1	1	
20					1				

Table 1: Using Apriori Algorithm

Minimum support: 0.55 (257 instances)

Minimum metric <confidence>: 0.9

Number of cycles performed: 9

Generated sets of large itemsets:

Size of set of large itemsets $L(1)$: 7

Size of set of large itemsets $L(2)$: 13

Size of set of large itemsets $L(3)$: 11

Of set of large itemsets $L(4)$: 5

Size of set of large itemsets $L(5)$: 1

Best rules found:

1. Attendance_School=Regular 442 ==> Previous_Result =Pass 442 <conf : (1)> lift:(1) lev:(0) [0] conv:(0.95)
2. School_type =Government 306 ==> Previous_Result =Pass 306 <conf : (1)> lift:(1) lev:(0) [0] conv:(0.66)
3. School_type =Government Attendance_School=Regular 302 ==> Previous_Result =Pass 302 <conf : (1)> lift:(1) lev:(0) [0] conv:(0.65)
4. Familysize=Small Attendance_School=Regular 281 ==> Previous_Result =Pass 281 <conf:(1)> lift:(1) lev:(0) [0] conv:(0.6)
5. Sex=M 265 ==> Previous_Result =Pass 265 <conf : (1)> lift : (1) lev:(0) [0] conv:(0.57)
6. Leaving_Area=Rural 263 ==> Previous_Result =Pass 263 <conf:(1)> lift:(1) lev:(0) [0] conv:(0.56)
7. Location_School=Rural Leaving_Area=Rural 262 ==> School_type =Government 262 <conf:(1)> lift:(1.53) lev:(0.19) [90] conv:(90.33)
8. School_type =Government Leaving_Area=Rural 262 ==> Location_School=Rural 262 <conf:(1)> lift:(1.78) lev:(0.25) [114] conv:(114.45)
9. School_type =Government Location_School=Rural 262 ==> Leaving_Area=Rural 262 <conf:(1)> lift:(1.78) lev:(0.25) [114] conv:(114.45)
10. Location_School=Rural Previous_Result =Pass 262 ==> School_type =Government 262 <conf:(1)> lift:(1.53) lev:(0.19) [90] conv:(90.33)
11. School_type =Government Location_School=Rural 262 ==> Previous_Result =Pass 262 <conf:(1)> lift:(1) lev:(0) [0] conv:(0.56)
12. School_type =Government Leaving_Area=Rural 262 ==> Previous_Result =Pass 262 <conf:(1)> lift:(1) lev:(0) [0] conv:(0.56)
13. Location_School=Rural Previous_Result =Pass 262 ==> Leaving_Area=Rural 262 <conf:(1)> lift:(1.78) lev:(0.25) [114] conv:(114.45)

14. Location_School=Rural Leaving_Area=Rural 262 ==> Previous_Result =Pass 262 <conf:(1)> lift:(1) lev:(0) [0] conv:(0.56)
15. Location_School=Rural Leaving_Area=Rural Previous_Result =Pass 262 ==> School_type =Government 262 <conf:(1)> lift:(1.53) lev:(0.19) [90] conv:(90.33)
16. School_type =Government Leaving_Area=Rural Previous_Result =Pass 262 ==> Location_School=Rural 262 <conf:(1)> lift:(1.78) lev:(0.25) [114] conv:(114.45)
17. School_type =Government Location_School=Rural Previous_Result =Pass 262 ==> Leaving_Area=Rural 262 <conf:(1)> lift:(1.78) lev:(0.25) [114] conv:(114.45)
18. School_type =Government Location_School=Rural Leaving_Area=Rural 262 ==> Previous_Result =Pass 262 <conf:(1)> lift:(1) lev:(0) [0] conv:(0.56)
19. Location_School=Rural Previous_Result =Pass 262 ==> School_type =Government Leaving_Area=Rural 262 <conf:(1)> lift:(1.78) lev:(0.25) [115] conv:(115.01)
20. Location_School=Rural Leaving_Area=Rural 262 ==> School_type =Government Previous_Result =Pass 262 <conf:(1)> lift:(1.53) lev:(0.19) [90] conv:(90.33)
21. School_type =Government Leaving_Area=Rural 262 ==> Location_School=Rural Previous_Result =Pass 262 <conf:(1)> lift:(1.78) lev:(0.25) [115] conv:(115.01)
22. School_type =Government Location_School=Rural 262 ==> Leaving_Area=Rural Previous_Result =Pass 262 <conf:(1)> lift:(1.78) lev:(0.25) [114] conv:(114.45)

V. Neural networks

Neural networks represent a brain analogy for information processing. These models are biologically exhilarated rather than clear-cut clone of how the brain actually functions. The figure 7 shows the similarities between artificial neural network and biological neurons. Neural ideas are usually implemented as system simulations of the massively parallel processes that involve processing elements interconnected in network architecture.

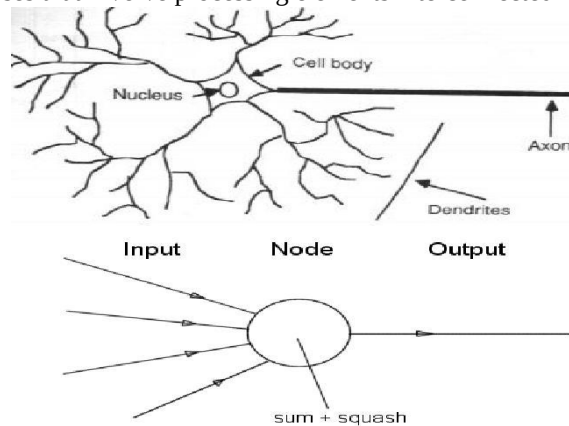
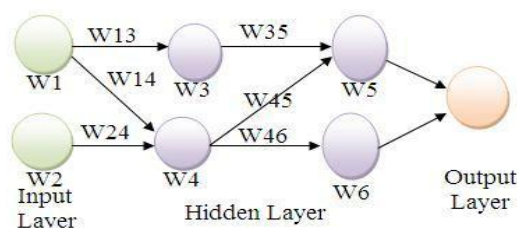


Figure 2: The biological and artificial neurons

Neurons receive the sum of information from other neurons or the external elements, perform transformation on the inputs and then pass the transformed information to other neurons or the external outputs. A typical structure is shown in Figure 8. For the better measurement and accurate result we have experimented by Multi Layer Involvement (MLI) of the Neural Networks (NNs) which is an advanced computational and learning method at modern computation and Intelligent Systems (ISs). A MLI consists of three layers named input layer, hidden layer, and output layer. A hidden layer receives input from the previous layer and converts those inputs into outputs for further processing. Several hidden layers can be placed between the input and output layers, although it is quite common to use only one hidden layer. Every working cell is connected with each of other cell as directed graph. A NN is very much similar with a directed graph where the neuron cells are considered as vertices and the connections between the cells are edges. In that case each edge is associated with its weights and the weights must reflect the measurements of the input and output results. Naturally an Artificial Neural Network (ANN) is consisting of Adaptive Linear Neural Elements (ADLINE) that changes its structure according to the. Propagation of information on external or internal matters through the network during the learning phase.



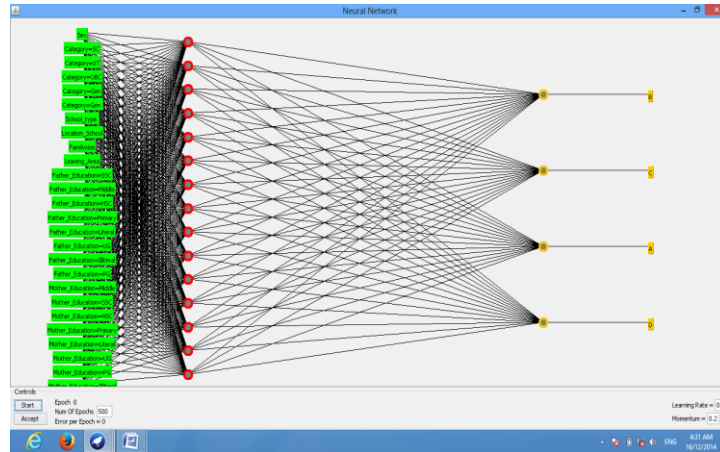


Figure 3: Neural Network

VI. Comparisons

The result of the both decision tree, Apriori and NN are very effective for this research. Both procedure are very suitable for predicts the accuracy of the result Improvement Though the efficiency we make a comparison and found that NN is better at the cases when the input size has the less difference in School Improvement primary school result as based in our Data Field on the contrary the NN is better while the input As per Decision Tree And Apriori Algorithm. NN is 96% is corrects and Decision Tree is 92.5% accurate in this research.

VII. Conclusion

It is very good to say that this research will help to assess the degree of Improvement students from any country especially from the developing country. We have measured the significant amount of Progress in students from primary stage due to the various socioeconomic problems like lack of knowledge, poverty, and social barrier. Our implementation is very efficient for Approach in Data mining. Besides this work we noticed a few drawback regarding the time line and data collections and organization. At future we will overcome the problems regarding the indicated problems.

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