International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 04 , April - 2026

Prediction of Students Results

Using Machine Learning and Index of Learning Styles

Rakesh Aralikatti
Dept.Computer Science and Engineering
Jain college of Engineering and Technology
Hubballi,Karnataka,India

Archana Mogali
Dept.Computer Science and Engineering
Jain college of Engineering and Technology
Hubballi,Karnataka,India

Abstract **- The new techniques of emerging technologies have not been entirely effective in solving the problems that have long existed and caused a discrepancy in the teaching and learning styles. The requirement of different courses under Engineering program such as electrical science, mechanical science, civil engineering etc., have different learning styles benchmarked with consultation with the experts of academia. The reason why the learning style questionnaire of Felder is being used is because of its suitability with engineering education to understand the various learning styles of the students and how such outcomes can be used to enhance the achievement of students. The literature review on learning styles predicting the performance of students enrolled in Under Graduate course using a few algorithms of Machine Learning (ML).**

Keywords - Learning styles, Machine Learning, Index of learning styles.

I. INTRODUCTION

Learning is a process of acquiring new or, alternatively, changing existing knowledge, behaviors, skills, values, preferences[1] It is a gradual or step-by-step process of obtaining knowledge. Learning can induce changes that may be permanent in the course of a lifetime, and the difference between learned information which appears to be lost and what cannot be recovered is difficult to draw[2]. Human beings begin to learn in womb until tomb which increases with time, experience and it is the running process which involves contact with people and environment. The study of nature and process of learning is included in many fields. The learning is of various kinds such as associative, nonassociative, multimedia etc[1].,

Learning styles of every individual are of different styles in which different learning styles are categorized. The two aspects of teaching and learning are two sides of a coin. Teach is share to gain and learning is gain to share knowing that learning style of individual in his/her context or range of context makes the teaching effective and thus making learning satisfied. Models proposed by many researchers are the ones which suggest the learning styles. [2]

Such learning model offered by Felder-Silverman is also index learning styles. It includes 44 questionnaires, which are of 4 classes, they are:

1. Active/reflective- active learner finds it easier to remember and learn through a process of doing something with the information, that is, discussing it or using it or making someone understand it. Reflective students would like to ponder about it privately first[5].

2. Sensing/intuitive- Sensing- Sensing learners enjoy knowing facts, intuitive learners usually enjoy finding out what can happen and what can relate. Sensors are not fond of courses whose apparent relations with the real world are not immediately obvious; intuitors are not fond of plug-andchug courses that require much memorization and drilling with algorithmic calculators.[5].

3. Visual/ verbal- Visual learners retain best things they can see pictures, diagrams, flow charts, time lines, films and demonstrations. Verbal learners derive more meaning out of words, written and spoken explanations. It is known that people learn better when given information using images and through speaking [5].

4. Global/sequential- Sequential learners have the tendency of attaining knowledge in a linear manner, that is, each step is the logical extension of the one before it. International students are more likely to be jump learners, processing content in a fragmentary fashion that they cannot see the links between and it finally comes to them in a flash[5].

Machine learning (ML) is a scientific field examining algorithms and statistical models which are applied by computer systems to complete a particular task without need of any instructions, instead of using patterns and inference. Machine learning algorithms create a mathematical model, using sample data, also referred to as training data, to perform predictions or make decisions even though they are not explicitly programmed to handle the task. Machine learning is a close equivalent of computational statistics which is concerned with prediction using computers. Mathematical optimization study provides techniques, theory and field of application to machine learning. Data mining is a research discipline of machine learning, and involves unsupervised learning of exploratory data analysis[4].

The machine learning gets to learn the algorithm with the knowledge that the supervised, unsupervised and semisupervised learning have their significance and drawbacks. Supervised learning-the algorithm takes a set of data, which has both the inputs and the desired output, and constructs a mathematical model. unsupervised learning-the

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 04 , April - 2026

algorithm takes a set of data, which only contains the inputs and no desired output labels. Semi-supervised learning-algorithms are built using mathematical models created based on incomplete training data, in which one of the segments of the sample input is not labeled[4].

The purpose of this paper is to achieve the improvement of the performance of the student not only by referring to his evaluation or his previous outcomes but also to the scores of the index learning style which can define the personal style of learning. This is compared to their academic performances and the future performances of the students are estimated. The analysis of data with the different machines leaning algorithm such classification, regression which can be applied to draw the performance of the student based on the learning styles of the students on the observations the teaching style may be enhanced. The categorization of the data of the students on previous results and rules are taken as the basis on which the predictions are drawn. The scores of index learning styles and their previous performance are significant contributors of the classification. Lastly through the rule based learning algorithm CN2 on which the models learn the rules by which the predictions are drawn which are represented through the use of the linear projection on which the students are categorized into various classes. The classification algorithm rule based (CN2) algorithm is applied to the student to predict his class. The paper is structured in the way introduction, literature survey, classification algorithm, and application of algorithm, result and conclusion.

II. PROPOSED ALGORITHM

The rule based learning that is referred to as CN2 algorithm. This is the most commonly popular algorithm concerning knowledge representation. IF-THEN rules set that determines the rule condition as the result of the algorithm in which the model is trained. The model gives maximum accuracy to the algorithm. The CN2 algorithm is the best amongst ID3, Bayesian classifier algorithm [9].The algorithm can work on the noise data as well and this is one of the merits that other algorithm fails to address. The algorithm is an iterative algorithm, at each iteration, it seeks an instance where a large number of examples of a single class and few of other classes can be covered. The case should be predictive and dependable as this depends on the assessment capabilities of CN2. The algorithm then on receiving good instance rule removes the examples that it covers on the training set and appends to the rule list rule C then predict to the rule list[9].

III IMPLEMENTATION

To meet the objective as outlined in the abstract data of Under Graduate students are gathered.
Data set:
The students provide details like their gender, background, rank they got in common entrance test (CET), medium of school, outcomes of index based learning questionnaires, outcomes in previous semester. The data of the final semester students to be considered as a model training. The data set has about 412 students responding to 44, Index Based Learning test and other details among them the class attribute being the target attribute bearing three classes of grade obtained which include First Class with Distinction(FCD),First Class(FC),Second Class(SC) and fail.
SYSTEM MODEL.

The data used training because it includes the detail by which the further semester data can be predicted. The data is visualized to known the behavior of students learning style. The model is trained using CN2 algorithm which outputs the IF condition THEN prediction of rules are learned and these are used to predict the data. The following figure shows the detail of the implementation:-

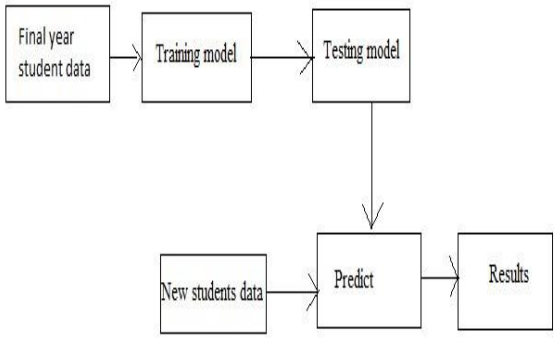


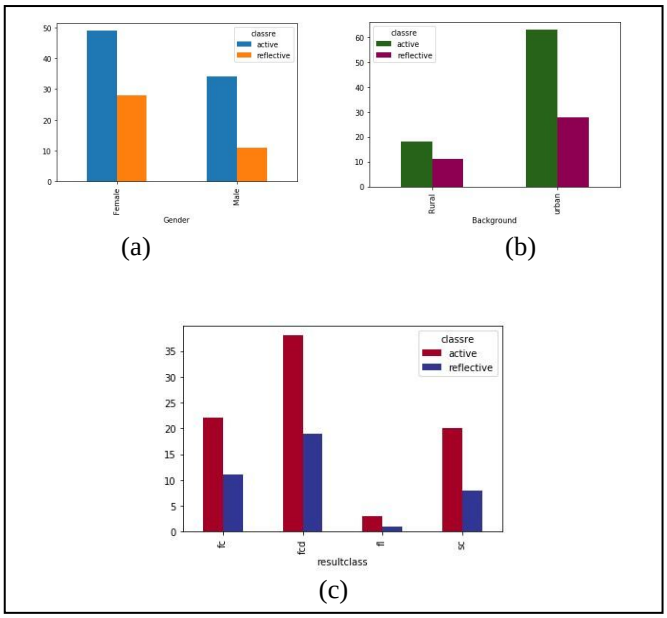
Fig 1. Workflow diagram.

The decision tree considers the gender, background and medium of study as the major attributes based on the entropy of which these from the root node of the tree and rest are leaf node but these can decide the performance of the student but students understanding dependence on style of their learning. The rule based learning IF instance THEN predict is learnt IF learning style THEN grade of class obtained. These rules form model are used to predict on new students data and obtain the grade of their class. The results are evident of students next semesters result.

IV RESULTS

The data is visualized through which the learning style of the students with respect to different attributes such as active/reflective v/s gender, active/reflective v/s Background and active/reflective v/s grade of class obtained similarly followed with other combination of learning styles.

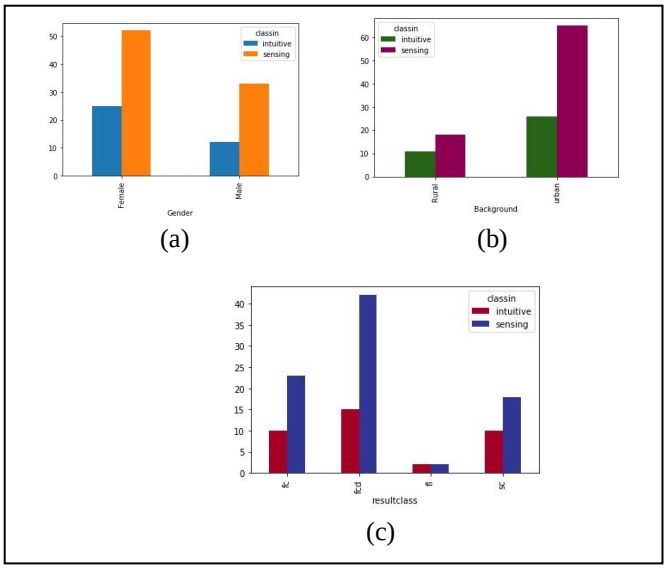
International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 04 , April - 2026



(a) (b)

(c)

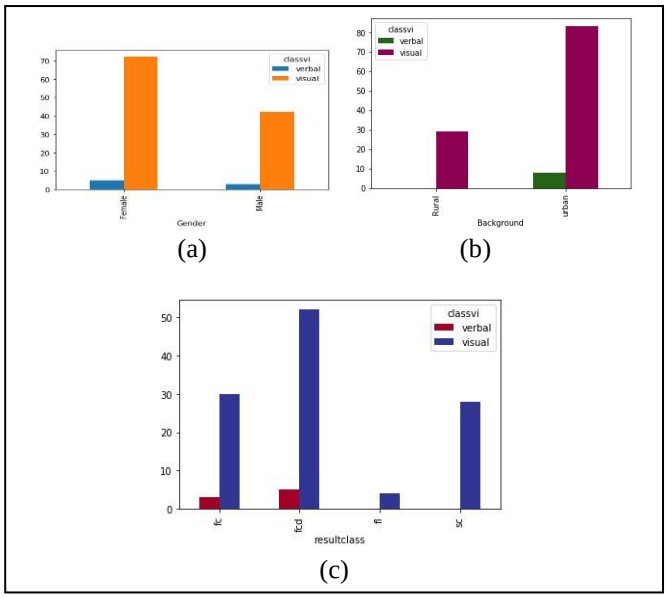
Fig 2.(a) graph of active/reflective score to gender, (b) graph obtained of active/reflective score to Background of education and(c) graph obtained for active/reflective to results



(a) (b)

(c)

Fig 3.(a) intutive/sensing score for gender,(b) intutive/sensing score for background of education and (c) intutive/sensing score to Resultclass



(a) (b)

(c)

Fig 4.(a)verbal/visual score to gender,(b) verbal/visual to background of education and (c)verbal/visual to Resultclass

As mentioned above in the implementation the prediction is dependent on the accuracy of the algorithm of data. The following table shows the values of which current accuracy(CA) is 1.00.

Method	AUC	CA	F1	Precision	Recall
CN2 rule inducer	1.000	1.000	1.000	1.000	1.000

Fig 5.Current accuracy of CN2 rule.

The prediction results are shown through the projection of which the axis indicates the different grades of class and data point within tells the class results of the students in the up-coming semesters.

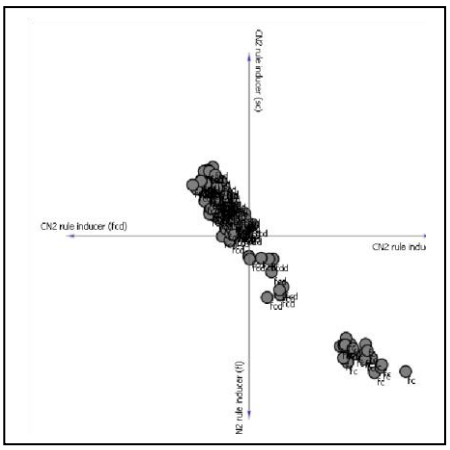


Fig 6. The prediction results of next semester.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 04 , April - 2026

As shown in the figure the maximum students are going to pass with result grade of FCD and FC classes respectively but, major of students are classified into FCD and FC classes is found because of the properties of the attributes and their score in the index learning style . The results show the performance is predicted with the help of learning style even several studies and algorithms are used in predicting the students result but these are obtained as consideration of learning style as major attribute.

ACKNOWLEDGMENT

Hereby acknowledge the institution for guiding and fulfilling all the needful in collecting the data of students. The reference authors for helping in getting out the idea to real experiment.

EFERENCES

[1] G. Eason, B. Noble, and I. N. Sneddon, “On certain integrals of Lipschitz-Hankel type involving products of Bessel functions,” Phil.

[2] rans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955. *(references)*

[3] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

[4] I. S. Jacobs and C. P. Bean, “Fine particles, thin films and exchange anisotropy,” in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

[5] K. Elissa, “Title of paper if known,” unpublished.

[6] R. Nicole, “Title of paper with only first word capitalized,” J. Name Stand. Abbrev., in press.

[7] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, “Electron spectroscopy studies on magneto-optical media and plastic substrate interface,” IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].

[8] M. Young, The Technical Writer’s Handbook. Mill Valley, CA: University Science, 1989.