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Review Paper on Learning Disability Predication with the Help of Machine Learning

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Abstract

A neurological disorder is a learning disability. Reading, writing, spelling, organizing, and other skills may be difficult for a child with a learning disability. It is not related to the child's intelligence. There is no known cure for learning disabilities. However, these kids can be helped to recognize their potential and choose a suitable career path if they are properly identified and supported. These days, machine learning is applied in many different domains to forecast future events. Predicting learning disabilities in children, determining the type of disability and how early it can be detected, is one of the most practical uses of machine learning. A primary concept in the field of machine learning is the ability to autonomously understand intricate outlines and make informed decisions using data. In recent times, the volume of catalogs has surged significantly. This increase has sparked a heightened interest in creating tools designed for the automated extraction of insights from facts. The phrase Data Mining in databases has been used to refer to a research domain focused on the automated uncovering of hidden information or knowledge within databases. Knowledge Discovery in Databases (KDD) involves the identification of valuable information within data. A commonly recognized formal definition of data mining will be presented next. This survey paper aims to comprehend the gaps in the various machine learning algorithms' implementation.

Keywords: *Learning disability, machine learning, Decision Tree, Rough Sets, Rule Mining and Support*

Introduction

There are several causes of learning disabilities. Neurological differences in brain structure and function are among the most important. A person with a learning disability has trouble putting information together. It is very difficult to understand these disorders. But researchers have made great progress in mapping the difficulties faced by different learning disabilities and specific parts of the brain. Visual, auditory, or motor impairments are not learning disabilities. Learning disabilities do not include mental retardation, emotional disturbance, or cultural factors.

Various learning disabilities

Learning disabilities that affect reading comprehension, math skills, and written communication are among the most prevalent kinds. Some disorders, such as attention deficit disorder and difficulty understanding language and behavior, may co-occur with these disabilities. Dyslexia is the term used to describe a reading learning disability. Dyscalculia is the term used to describe a mathematical learning disability. Dysgraphia is the name given to a particular type of learning disability in writing. An auditory processing deficit (also called an auditory processing disorder) is any weakness in understanding and using what you hear. Visual Processing Disorder is the term used to characterize a weakness in the ability to comprehend and use visual data.

Machine Learning

Machine learning is utilized in many different domains and applications where it is necessary to predict specific results. It contains a class of algorithms that, without explicit programming, enable software programs to learn and improve their outcome prediction skills. Creating algorithms that can absorb input data and predict output using statistical analysis. The cost is updated when new data is available, a fundamental idea of machine learning. Predictive modeling and data mining share many of the same procedures as machine learning.

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Both necessitate analyzing data to find trends and modifying program operations appropriately.

Machine Learning Procedures:

A number of machine learning procedures are generally used, these contains:

1. **Linear regression**

This method is utilized to forecast numerical outcomes by establishing a linear connection among various values. For instance, it can assist in estimating real estate prices using previous data from the area.

2. **Logistic regression**

This supervised algorithm is designed to forecast categorical outcome variables, such as binary responses like "yes" or "no." It is applicable in scenarios like differentiating spam emails and monitoring quality on production lines.

3. **Clustering**

Through unsupervised learning, clustering techniques can detect patterns within data, allowing for its organization into groups. Data scientists can leverage computers to recognize variations in data items that may be missed by human analysis.

4. **Decision trees**

Decision trees can be used for both numerical prediction and classification. They are based on a series of connected choices which can be represented in a diagram. A major advantage of decision trees is that they are simple to validate and audit, compared to neural networks.

5. **Random forests**

In a random forest model, the algorithm makes predictions regarding a value or category by aggregating the outcomes of several decision trees.

Associated Effort

Research Paper Title	Name Of The Author	Dataset	Algorithm	Output
A model designed for predicting learning disabilities in children utilizing artificial neural networks.	Ambili. K, Afsar. P	30 children data collected as questionaries	Rough Set Approach, Decision Tree and Artificial Neural network	The performance of ANN surpasses that of other algorithms significantly.
Forecasting significant indicators of learning disabilities in children of school age through rough set analysis.	Julie M. David,K Balakrishnan	40 children data collected as questionaries	Naïve Bayes Batch classifier for rough set classification. SMO algorithm in SVM.	The results derived from SVM demonstrate a slight edge in accuracy.
Importance of several classification approaches in estimating learning incapacities.	Julie M. D, K.Balakrishnan	Total data set of 125 students.	J48 procedure is used for building the decision tree.	The J48 procedure is highly effective in managing missing data. It can be utilized on both continuous and categorical datasets.
A model for anticipating learning disabilities in school-aged children through a combination of Naïve Bayes and neural network techniques.	K.Ambili P.Afsar	30 school children Questionnaire	Naïve Bayes, back propogation neural network. Fusion technique of both	The combination of Naïve Bayes with a Neural network outperforms the individual algorithms significantly.
ML & Dyslexia	Rehman Ullah Khan,Julia Lee Ai	857 sample collected from primary-I school	Machine learning algorithms.	The proposed model was suggested model achieved a remarkable 99% accuracy in identifying dyslexic students.
Enhancements in the effectiveness of fuzzy and neuro-fuzzy systems: predicting learning incapacities among school-age children.	Julie D, K.Balakrishnan	Total data sets 1020	Fuzzy and Neuro fuzzy systems. Better algorithm to handle missing values.	The fuzzy and neuro-fuzzy systems yield superior results compared to J48 and other classifiers.
Identifying students with dyslexia via ML techniques that incorporate eye tracking data.	L.Rello,M. Ballesteros	Eye tracking trial preformed on 97 students	-	Eye-tracking techniques hold promise for diagnosing dyslexia.
An evaluative comparison on the categorization of learning disabilities using soft computing and AIS practices.	M. Revathi, K.Arthi	questionnaire used as Data set	Soft calculation methods and AIRS procedures	AIRS procedures reveal greater classification accuracy in comparison to soft computing

				approaches.
Assessing dyslexia through computational analysis.	Hassanin M. ,Barhamtoshy, Diaa Motaweh	Data set collected from 80 students.	Calculation replicas are Kmeans, Fuzzy logic and ANN	Fulfillment with accuracy stands at 96%. The proposed system demonstrates significantly higher accuracy than conventional methods.
Categorization of childhood disabilities employing false neural networks.	Jumi K, Kandarpa Kumar Shrama	518 total data set collected.	MLP built model for classifying disabilities	Classification outcomes have been promising. However, several key attributes could not be included due to insufficient data.
Data classification employing semi-supervised learning in a case study related to learning disabilities.	Pooja M Mishra, Dr. Sushil Kulkarni	340 Dataset size.	SVM classifier	The accuracy level is at 84%. This algorithm is highly effective for selecting attributes.

Conclusion and Upcoming Effort

Machine learning is utilized in many different domains and applications where it is necessary to predict specific results. It contains a class of algorithms that, without explicit programming, enable software programs to learn and improve their outcome prediction skills. Creating algorithms that can absorb input data and predict output using statistical analysis. The cost is updated when new data is available, a fundamental idea of machine learning. Predictive modeling and data mining share many of the same procedures as machine learning. Both necessitate analyzing data to find trends and modifying program operations appropriately.

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Conflicts of interest

There are no conflicts of interest.

References:

1. A comparative study on classification of learning disability using soft computing with AIS techniques, International Journal of Innovative research in advanced engineering (IJIRAE) ISSN: 2349-2163, M. Revathi, K.Arthi.
2. Classification of data using semi-supervised learning (a learning disability case study), International Journal of Computer Engineering and Technology (IJCET), ISSN 0976 – 6375(Online) Pooja M Mishra, Dr. Sushil Kulkarni.
3. Machine learning and Dyslexia : Diagnostic and classification system (DCS) for kids with learning disabilities, International Journal of Engineering & Technology ,Rehman Ullah Khan,Julia Lee Ai Chang,Oon Yin Bee,
4. Performance improvement of fuzzy and neuro fuzzy systems: Prediction of learning disabilities in school-age children, I.J. Intelligent Systems and Applications,2013, 12,34-52 ,By Julie M. David, K. Balakrishnan
5. The prevention of reading difficulties. Journal of School Psychology. Torgesen JK.
6. Data mining: practical machine learning tools and techniques. 2nd ed. Amsterdam; Boston, MA: Morgan Kaufman; 2005.
7. An alternative approach to identifying early reading disability. Journal of Educational Psychology. 2001 Dec; 93 (4):735–49. Speece DL, Case LP.
8. A framework for learning disability prediction in school children using artificial neural network, International Journal of Advanced Research in Science, Engineering and Technology, By Ambili K,Afsar .
9. Prediction of key symptoms of learning disabilities in school-age children using rough sets, International Journal of Computer and Electrical Engineering, By Julie M. David, K.Balakrishnan.
10. Significance of classification techniques in prediction of learning disabilities, International Journal of Artificial Intelligence and Applications (IJAIA), By Julie M. David, K. Balakrishnan.