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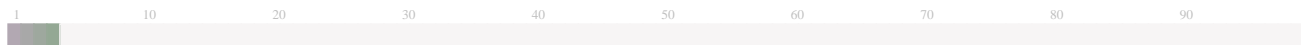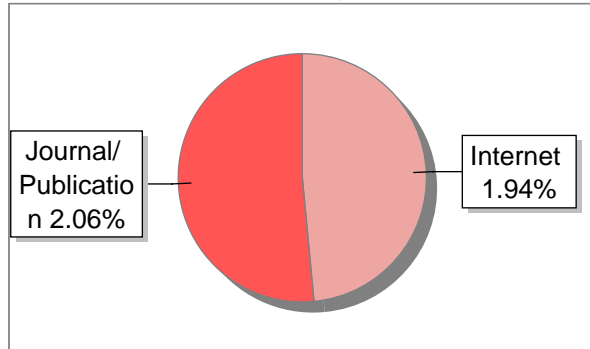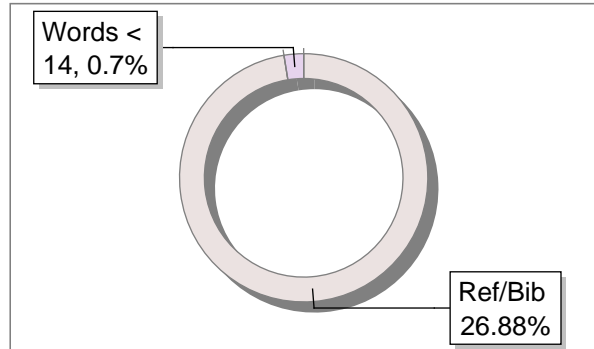
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Analysis of learning outcomes by leaning behavior characteristics using deep learning techniques

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ABSTRACT:

Information literacy is a basic ability for college students to adapt to social needs at present, it is an essential trait for self-directed learning and continuous lifelong education. It is highly effective way to reveal the information literacy teaching mechanism to use the rich and diverse information literacy learning behavior characteristics to conduct the learning effect prediction analysis. This paper examines the traits of college student's learning behaviors and gives the suggestion for the students to overcome their problems based on information literacy learning behavior characteristics. The experiment used 320 college students' information literacy learning data from Chinese university. The Pearson algorithm is employed to examine learning behavior characteristics of college students' information literacy, revealing that a significant correlation exits between the characteristics of information thinking and learning effect. This paper puts forward differentiated intervention suggestions and management decision-making reference in the information literacy teaching process of college students, with a view to adjusting the information literacy teaching behavior, improving the information literacy teaching quality, optimizing educational decision-making, and promoting the sustainable advancement of high-quality and innovative talents in the information society. Our work involving research of the thinking and direction of Promoting the sustainable advancement of information literacy training proved to be encouraging.
Keywords: Educational Data Mining, Predictive Analytics, Student Performance Analysis.

INTRODUCTION

With the swift advancement of information technology exemplified by computers, network technology and communication technology, computers. The Internet and computers extensively employed throughout various applications and industries numerous societal domains. Information now plays a crucial and growing role in the progress of human society, becoming among the highly regarded dynamic and influential elements in all areas and the internet, a ubiquitous tool, has found extensive applications across driver's fields of society. Information plays an increasingly important significant contribution to development of human society and increasingly becomes one of the most active and decisive factors in all fields of society. Information

literacy, critical thinking and creativity are the other skills that college students must master in the 21st century [1]. In the information age, information literacy is an important part of college students' core literacy. Information literacy is a kind of adaptability to the information society. The information literacy of college students is directly related to the long-term growth of future talents and the cultivation of innovative talents [2], [3].Information literacy included in cultural literacy and overall quality. Cultivating college students' information literacy has already become an important issue facing contemporary higher education. An overview of to an analysis of learning outcomes by learning behavior characteristics using deep learning techniques might begin by discussing the significant of comprehension how individual learning behaviors impact educational outcomes. It could highlight the growing interest in leveraging deep learning methods to examine large volumes of data collected from educational platforms, such as online courses or learning management systems. The introduction could also mention the potential benefits of such analysis, including personalized learning experiences, early intervention for struggling students, and the optimization of educational resources. Additionally, it might touch upon the challenges involved, such as data privacy and the necessity for robust algorithms capable of managing intricate learning behavior data are highlighted. In essence the introduction establishes a foundation for investigating how the amalgamation of deep learning and educational research can enhance learning results.

Information literacy includes the basic knowledge and skills of information and information technology, the ability to use information technology to learn, cooperate, communicate and solve problems, in addition to information awareness and social ethics. Currently, education on information has received the attention of people from all walks of life. The education departments and libraries within the United States, the United Kingdom, Australia and various other nations have conducted information literacy education to different degrees. Students' information literacy and digital literacy are expected to be further improved in the next few years [4].Over the upcoming years, due to the impact of online teaching and hybrid teaching, and the advancement of artificial intelligence technology with information literacy has also received more and more research attention. Numerous colleges and universities at home and abroad have opened information literacy courses through various ways to conduct targeted

information literacy education. For example, on the MOOC platform of the University of China, Tsinghua University has opened ''Information Literacy: A Compulsory Course for Academic Research'', Wuhan University has opened ''Information Literacy and Practice - A Pair of Academic Eyes'', Sun Yat-sen University's ''Information Literacy General Course - A Compulsory Course for Digital Survival'', and Sichuan Normal University's ''Information Literacy and Lifelong Learning(Autonomous Mode)'' [5].Considering the current state of information literacy education for college students, many problems have emerged. In the field of education big data, learning

Prediction is a very meaningful topic. Learning effect prediction is one of the core issues in the field of learning analysis. Its essence is to use various data generated by learners in the learning process and use the method represented by machine learning to predict the learning effect. In accordance with the prediction results, teachers can know the learners' learning status in time and intervene in the learning process in time. Such as improving learners' learning habits, adjusting teaching strategies, etc. Wufati and Hao [6].Learning analysis technology has developed from principle exploration and application value to application in learning behavior analysis, data visualization and learning prediction Hang et al. [7]. Learning prediction is based on learning achievement, learning goals, and learning ability, and predicts learning effect and learning experience based on the characteristics of learning behavior before and after learning AlShammari et al. [8].The prediction of learning results includes prediction theoretical model, empirical research of prediction model, comparison of algorithms, development of algorithms, research of early warning factors and literature review, etc.

LITERATURE REVIEW

Understanding the intricate relationship between learning behavior characteristics and learning outcomes has been a central focus of educational research for decades. With the emergence of deep learning techniques, scholars have increasingly turned to advanced computational methods to unravel the complexities inherent in this relationship. Various theoretical frameworks underpin the study of learning behavior characteristics, providing conceptual perspectives that researchers can use analyze and interpret empirical data. Bandura's as outlined in social cognitive theory, emphasizes the interplay the interaction among individual factors, environmental behavioral outcomes, offering insights into how learners' self-efficacy beliefs and motivation impact their learning behaviors and academic performance.

S.NO	AUTHORS/ YEAR	TITLE	OBSERVATIONS
1	Chen, L., Wu, X.	"Classifying Student Learning Behaviors for Predicting Academic Performance: A Sequential Approach."	This study proposed a sequential pattern mining approach to classify and predict academic performance based on learning behaviors, discussing the relevance of behavior sequences in predicting learning outcomes.
2	Cruz-Benito, Borrás-Gené, O., de la Prieta, F.	Student Clustering According to Learning Behaviors and Performance Using Deep Learning Techniques	The research explored the use of deep learning models to cluster students based on their learning behaviors and performance, highlighting the effectiveness of deep learning in identifying patterns for outcome prediction.
3	Pardos, Z.A., Trivedi, S., Taylor, S	"Modeling Individualization in a MOOC for Predicting Performance with Deep Learning."	This work employed deep learning techniques to model individual learning behaviors in Massive Open Online Courses (MOOCs) for predicting performance, emphasizing the importance of personalized learning paths.
4	Al-Azawei, R., Al-Gneem, M.	"Predicting Students' Performance by Deep Learning Technique: A Case Study of a Public University in Oman"	This study focused on predicting students' academic performance using deep learning, demonstrating the efficacy of these techniques in forecasting outcomes based on behavioral patterns.

PROPOSED SYSTEM

PROBLEM STATEMENT

The Student Insight project addresses challenges in educational systems, aiming to enhance student performance and academic outcomes. It introduces an application leveraging machine learning techniques to analyze various factors influencing student performance, including academic records, demographics, and extracurricular activities. The project aims to develop an all-encompassing solution provides valuable insights into emerging trends in student performance and pinpoints potential areas of enhancement, and supports educators and administrators in making data-driven decisions. Emphasizing usability and effectiveness, extensive research ensures the application is technologically advanced and user-friendly, catering to address the requirements of educational stakeholders

OBJECTIVES

The primary objectives include streamlining application procedures for educators, administrators and stakeholders.
• To create a software application that is easy to use and operate for educators, administrators, and other stakeholders involved in student performance analysis.
• To leverage machine learning techniques to analyze student data and identify factors contributing to academic success or challenges.
• To provide insights and recommendations for educators to support student in their academic journey, including personalized interventions and support strategies.
• To improve the efficiency of educational interventions and programs through data-driven decision-making.
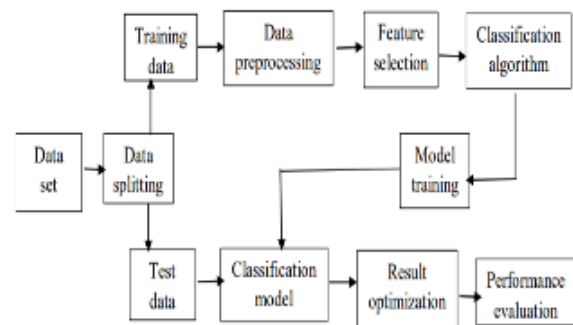
METHODOLOGY

Fig 1: Design Diagram

The founding of a digital campus has improved the efficiency of university management and has also brought great convenience to students, faculty, and staff. The digital management system can collect a large amount of data, which play a significant role in overseeing of the school. As for the daily management of students, if we can learn more about students, we can deploying programs with increased efficacy different students, so that we can teach students aligned within accordance with their aptitude and enhance the degree of education of the school. The traditional

analysis and management of student behavior mostly relies on the personal experience of the manager and lacks the individualized cognition of the learner. Simultaneously, it cannot in-depth guide students' learning behaviors, provide personalized learning situations, and promote learning optimization. Analyzing student life and learning behavior based on intelligent technology are of great significance to the investigation of potential abnormal the forecast for students and their future development. The key to understanding students is the data gathered in the digital campus for students' study, life, and consumption. These operations will generate a large amount of student behavior data. Using machine learning technology as its foundation, this paper conducts cluster analysis on campus all-in-one card data and analyses the behavior of students. Recently, there has been a noticeable extensive research on student behavior analysis. The main work of this paper is as follows as Collect student consumption, life, and learning data through the campus all-in-one card system and integrate data from different institutions to shape a comprehensive data set for student behavior analysis. By deciphering how individual students navigate the learning landscape, educators can tailor interventions to address specific needs. This targeted approach has the capacity to enhance overall learning experiences and foster a more inclusive educational environment. In contrast to conventional methods, deep learning approaches enable a more granular comprehension of the learning process.

RESULT AND DISCUSSION

The related elements must have some kind of association or likelihood in order for correlation analysis to be performed. If two variables have a strong interdependence, then we can say that the two variables have a strong correlation. If the values of both groups increase simultaneously they are described as positively correlated; The significance of a particular group increases, then the worth of the other group decreases, termed as negative correlation.
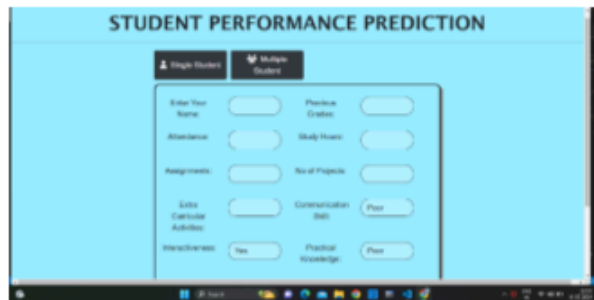

Fig 2: Home Page

Fig 3: Performance prediction of particular student

Modeling feature subset selection can be attained through correlation analysis of learning behavior characteristics and learning effect. Correlation analysis is the analyzing two or more elements of variables that are related as a measure of their level of correlation.

Fig 4: Performance prediction of multiple student

The Pearson correlation coefficient calculated for each variable and the learning effect was computed to quantify the linear correlation among the existing variables. There is a positive correlation linking the variables are shown in Figure 4. The intersection where the two variables intersect in rows and columns is the significance plot, and the color knob at the bottom corresponds to the correlation coefficient. The correlation between the predictor variables and the learning effect is shown in Figure 3. R takes values between -1 and +1. If r>0, it means that there is positive correlation between the two variables i.e., As the value increases one variable as the value increases the other variable; if r It was deduced that the vast majority of the predictor variables exhibited a degree of positive correlation with learning outcomes. As the correlations reflect some variability, this provides support for studying the learning process learning behavioral characteristics.
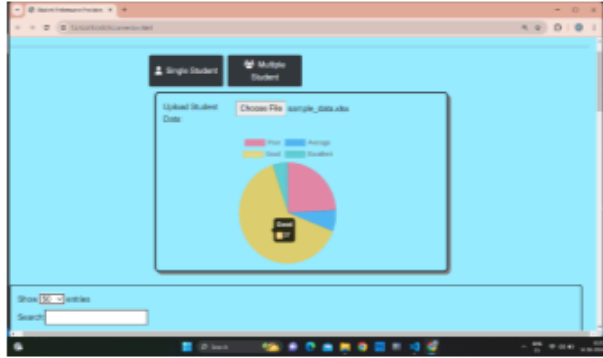
Fig 5: Visualization of graph

CONCLUSION

In summary, the creation of the input module for analysis of student performance marks a significant milestone in the realm of educational analytics. Through meticulous data collection, preprocessing, and feature engineering, this module lays the groundwork for insightful and actionable analysis utilizing machine learning techniques to analyze student performance involves leveraging various data sources. Diverse data sources and advanced preprocessing methods, educators and administrators have the opportunity to access abundant information that can inform decision-making, personalize interventions, and drive improvements in educational outcomes. The module's modular design and scalability ensure adaptability to evolving educational contexts and emerging data sources, positioning it as a versatile toolkit for enhancing educational practices.

As we look ahead, the future scope of this input module shows great for continued innovation and collaboration. Integration with advanced algorithms, real-time data processing capabilities, and personalized learning approaches opens new avenues for optimizing student success. Moreover, collaborative research initiatives and enhancements in visualization and reporting promise to improve the and usability of the module, facilitating more informed decision-making and driving continuous improvement in educational analytics.

In essence, the input module for student performance analysis represents a cornerstone in the path to leveraging data-driven insights to unlock the full potential of every student. It embodies our commitment to innovation, collaboration, and excellence in education, paving the way for a brighter a future in which every student is empowered to thrive and succeed.

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