BIG DATA TECHNOLOGY IN EDUCATION

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Abstract: This study provides a review on Big Data Technologies, its advantages, implementations and challenges within the education sector. Big Data Technology plays an important role in education sector by facilitating institutions, management, educators and learners to improve the quality of education, enhance learning experience, predictive teaching and assessment strategy, effective decision making. Students have started using smart phones that became a part of their lifestyle, to access online content. Student's online activities generate huge amount of data that are wasted as traditional learning analytics aren't capable of processing them. This has resulted in the use of Big Data Technologies and tools into education, to process massive amount of knowledge involved. This study looks into the recent applications of Big Data Technologies in education, challenges and need of massive data within the education sector.

Keywords: Big Data, Big Data Technology, Apache Hadoop

I. INTRODUCTION

The term "Big Data" refers to a set of data that's very large or complex that conventional methods aren't sufficient to process them. The term also refers to the tools and technologies that are accustomed to handle Big Data. Huge amount of information shared within the internet daily, views of YouTube videos, twitter feeds and mobile phone location data are the examples of Big Data. In the recent years, data produced by learning environments have also began to get large enough raising the necessity for Big Data technologies and tools to handle them.

The advancement of technology and also the Internet have facilitated education with various sorts of teaching, learning and assessment methods that can be achieved on or off the campus, inside the classroom or virtualized environment. Advanced technologies and social media have made online and distance learning accessible at low cost for everyone no matter age, gender or employability status. Online education platforms including Coursera, Show Academy, and Udemy provide online courses for anyone who wants to learn in contrast to traditional learning.

Through traditional application software, big data won't be processed. Hence, it requires cloud-based technologies like Hadoop and Spark to mine huge amount of information. This big data approach offers organizations with effective way to stay strong and active within the business. In addition to this, Hadoop platform has received attentions because it renders various advantages to the institutions and learners. This study aims at the influence of big data in the education and how the education system will be enhanced by using big data analytics.

II.   ADVENT OF BIG DATA IN EDUCATION

In the current learning environments, users learn through online platforms like discussion forums, online chats and various Learning Management Systems like Moodle. Students have started using smart phones to access the content associated with their studies. Today learning environments became accessible anywhere through the web, students access their courses anywhere and have interaction in learning activities. Student's activities through online learning platforms create huge amount of information which will be further utilized in building a improved learning environment, helping the scholars in learning and improving the general learning experience. The world is suffering from coronavirus. Students now pursue their education through online. The traffic of online courses is growing exponentially. People search eLearning programs, install software to enhance their skills. Video streaming software is practiced by schools to conduct classes online. Additionally, to the info available from student activities, data also are generated by educational institutions which use applications to manage courses, classes and students. the quantity of information generated within the above scenarios is extremely huge that conventional processing techniques won't be able to process them. Limitations of the normal processing applications made the institutions to explore "Big Data" technologies to process the data. Data scientists will examine all the knowledge on how this software was used, problems faced by the users, what their preferences were, how often or rare their attendance was, what tests they passed successfully. Big data scientists will study the user behaviour and the results will be sent to the universities and corporations to make a much bigger impact on education.

III.   PROPOSED APPROACH OF BIG DATA IN EDUCATION

The objective of this approach is that use of big data technology in education implemented using Apache Hadoop within the system process. Batch processing and stream processing are utilized in processing the educational data in this proposed approach. Batch processing is that the approach of evaluating the blocks of information over a particular period of time. Hadoop MapReduce is the effective platform for processing the data in batches. In the educational sectors, the stream of data has divided into blocks of information and performs the function by using Hadoop platform. The stream processing tends to process the data in real time as they determine the condition in small amount of time. It enables to give data into analytics tools and receive analytics results. These two types of processing are used to improve the performance of the educational data. With the assistance of cloud data flow, this process is going to be accessed efficiently.
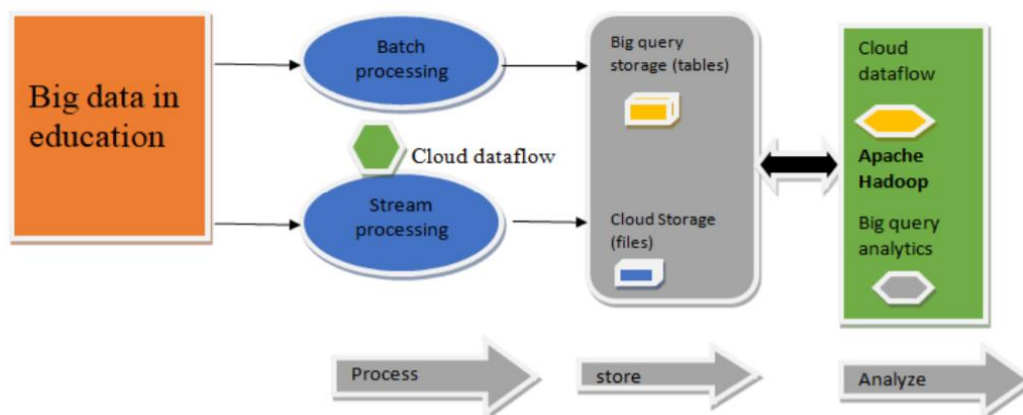
IV.   ADVANTAGES OF BIG DATA TECHNOLOGY IN EDUCATION

Enhanced Learning Experience

Education sector aims to reinforce the learner experience, improve the educator effectiveness, and supply appropriate, efficient and effective teaching and learning environment. Big Data contributed in forming expectations for achievements, accountability, and access, which is required for smart societies development. this will be accomplished by providing the infrastructure and capacity for sustainable change that results in the institutionalization of data acquisition, exchange, and creation. Big Data Technology facilitates the communications and accessibility for learners, educators, and administrators. Educational data are often aggregated over large numbers of learners who are often explored through data processing algorithms for model building. These developed models are utilized via constructing adaptive learning systems during which the adaptations supported model's predictions are often wont to change what learners may experience next or recommend external academic services to support their learning progress.

Enhanced quality of education

The appropriation of BDT in advanced education is essential on account of expanded rivalry, accreditation, evaluations and guidelines. Decision makers will undoubtedly settle on basic choices dependent on the significant data extricated from investigating the information. They are worried about the smart results of the establishment to distinguish the students learning achievement rates, examples and challenges, other than their scholarly advancement. Big Data Technology manages the colossal measure of instructive information for breaking down and following student's set of experiences through college and work level. It stores time-stepped student's sources of info and practices during their learning cycle. It likewise empowers keeping tabs on student's development other than their future course results and dropouts. It's anything but another worldview for the partners to choose best practices that smooth out showing cycles, fulfillment, and victories. Governments, for example, The United States Department of Education has received Big Data Technology as a feature of its National Education Technology model for the 21st-century learning intend to improve their nature of schooling guidelines.

Predictive teaching and assessment strategy

Big Data Technology empowers teachers getting moment target input to assess the construction of their courses and the adequacy of their educating and appraisals measures furthermore, strategies. They can screen the learning interaction for early location of student's shortcomings and disappointment chances as per the student's abilities and information level. Big Data Technology works with identification and following of projects, courses and substance defects to improve the educational programs contributions, by giving information examination and inside and out experiences into the created and accumulated information. BDT gives customized directions, responsive developmental evaluations, effectively drew in instructional method, and community-oriented learning. It works with foreseeing students' exhibitions dependent on the examination of their set of experiences as a marker of future grades.

V.   APPLICATIONS OF BIG DATA IN EDUCATION

Performance Prediction

Predictive Analytics empowers expectation of student's conduct, ability and performance by examining different exercises performed by the student while cooperating with the Learning Management System. In view of the exercises of the

students, the performance of the students can be anticipated utilizing the data mining procedures that can be utilized in distinguishing the underperformed students so the educators can focus more on improving them.

Expertise Estimation

Expertise Estimation alludes to the assessment of the abilities of the students with the goal that the learning environment can be acclimated to suit the student's abilities. Abilities were determined based on the cooperation of the student with the framework or in the message sheets or discussion forums.

Improved marking system

Big Data assists instructors to follow the performance of students. The examination helps in understanding the exhibition of an individual and an aggregate level. The factual investigation of individual grades will assist teachers with understanding the interested area of students. The marking system can be improved to feature the key regions where the student has dominated. This system will likewise permit instructors to give important input to students and help them in picking the right profession way.

Personalized Program

Instructors can make personalized programs for students dependent on their grades and in the wake of understanding their capacity to focus. Likewise, students can be offered mixed learning that incorporates openings for disconnected and internet learning. Through personalized programs, students can get to the study material online along with the classes. They can learn at their own speed. Therefore, more students acquired the ideas and discovered the examination material valuable, which was not the situation for the Standard offline class.

VI.   CHALLENGES

Storage

While the normal limit of hard disks these days is in the scope of terabytes, the measure of information produced through web is in the order of exabytes. In spite of the fact that the information produced in educational institutions isn't just about as extensive as all the information created through web, it is adequately enormous, and would get much bigger in future. The conventional RDBMS tools will be not able to store or deal with such Big Data. To defeat this challenge, databases that don't use conventional SQL based queries. Compression technology is utilized to pack the information very still and in memory.

Security

CyberCoders reports expressed that the digital universe would arrive at 40 zettabytes before the decade's over. This tremendous measure of uncovered data can cause debacle whenever misused on personal, industrial, legislative and country level. Some new incidents happened that had a deadly effect, for example, WannaCry, Petya, and Goldeneye assaults. Conventional security strategies, for example, disaster recovery plans, strong password policy, firewalls, encryption and antivirus software are not adequate enough to get secure innovations like Big Data, Internet of Things (IoT), and Cloud Computing. Training foundations need satisfactory approaches that manage and administer the intellectual property just as admittance to information alongside getting the capacity, transfer, and processing of tremendous sets of educational data types.

Privacy

Big Data in education requires straightforwardness that uncovers the personality of the student to illuminate choices. For instance, the Massively Open Online Courses "MOOCs" gather, unify, and investigate the students' information. This tracking of students' education records, performance, and how, when, and where they click each time to sign in; can likewise be utilized by a noxious. Moreover, utilizing Big Data Technology tools to predict student's future results, scholarly performance and commitment may abuse their privacy. For instance, some training site hacking brought about huge number of clients' record being promoted for unlawful deal on the dark web. Other issue raise as Big Data is that it's

anything but a solitary distributed storage data set which may prompt a protection penetrate since it holds a huge number of students and related instructive records. The Privacy Rights Clearinghouse information base have recorded 777 instructive breaks involving 14.8 million records of students' information.

Analysis

As information created to a few kinds of web-based learning vary in structure and the size of the information is additionally colossal, analysis of the information may take a lot of time and resources. To defeat this, scaled out structures are utilized to deal with the information in a disseminated way. Information is parted into more modest pieces and handled in countless PCs accessible all through the organization and the processes information is collected.

Reporting

Conventional reports include display of factual information as numbers. At the point when enormous measure of information is included, conventional reports become hard to decipher by individuals. In those cases, the reports should be addressed in a structure that can be effectively perceived by investigating them. The Big Data innovations defeat these difficulties utilizing different methods.

VII. CONCLUSION

Through this study we can see that Big Data can truly improve the learning. Can bear to shape a modern and dynamic schooling framework, which each individual student can have the most extreme benefit from that. Moreover, educators have important tools, where they don't have previously, which can settle on their choices more explicit and can pick a major assortment of new learning strategies. Thus, the Big Data are really included to change the method of enterprises including the education. In the new time of Data, the conventional challenges will not exist anymore, keeping the great strategies. The education framework will be enhanced with new learning ways, making more productive and designated. However, the method of this new time, have quite recently started and there are numerous troubles, for example, the absence of experienced faculty on the study of Big Data and Data investigation. Moreover, the instructors and academics should really prepare and involved on them and the students should acknowledge and utilize these new tools.

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