

Impact of Big Data on Learning

Abstract

With the advancements in technology many different forms of data exist which has lead to the huge size of data on internet. It is gaining attention from different domains which also includes education. Students' access to online activities generates methods for processing the data should also become smarter. Traditional methods were not sufficient to handle it. So there is need of Big Data and its tools for handling large volumes of data. The findings revealed that Big Data emerging technology has provided innovative shift of information to enhance learning resource. It has provided many benefits to the students to become independent learners, huge access to information, interactive feedback. This study is expected to improve learning environment and their outcomes.

Keywords: Big Data, Technology, Learning Environment, Internet.

Introduction

Data is always around from traditional time period and it always needs storage, processing and management of data. But as the volume of data is increasing day by day traditional methods of processing were not sufficient. Big data generates terabytes and petabytes of data every second. From the last few years recent trend arise in managing learning data. One of the major factors that changed the scenario of education system is its technology. Students have started using online communities based learning as online chats, discussion forums, flipped classroom, instant messaging, smart phones etc that generates large amount of data which must be handled properly for further learning experience. There is a great variation in educational data from students' usage to learning activities that includes objectives, examination results evaluation, curriculum, syllabus designing and many more. Big Data techniques in education allow allows educational systems to determine issues faced by the students and how to improve the methods by using different tools and techniques. Teachers can use visualizing techniques to identify performance of the students and also students can create personalized dashboards which promote self- directed learning among them.

Aim of the Study

Improved Performance

It helps in the overall improvement of students performance and learning as the lessons can be adjusted according to the ability of the students.

Commensurate Students to Programs

The availability of open data helps the parents and students to find the best school or best education program.

Commensurate Students to Employment

It helps in finding organisation and candidates the best alternatives and more effective tools to use open data to match their skills with the needed skills.

Transparent Education System

It helps the students to participate in the educational activities and to explore the most efficient education program for them.

Improved System

It helps to develop effective educational resources that can enhance performance and helps in building smart plans for future education programs.

Big Data Emerging Technology

Big Data generates large volumes of data on a continuous basis from different digital devices like tablets, smart phones, laptops and many social sites. The number both in devices and statistics generation of data is increasing day by day. One of another main reason which extends to the importance of Big Data is digitization. It is the process of converting analogue information to the digital form and it is also termed as mass digitization. Big data is viewed from different perspectives as structural and



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E: ISSN NO.: 2455-0817

functional. Structure dimension includes many factors as volume, variety, velocity and veracity of data. Functional dimension views the data by analyzing it using different techniques for processing and analyzing. Due to several advantages of Big Data many organizations as academics, business and government researchers have got attracted towards it. Although Big Data is very important but it has to face many challenges in managing and processing of data. Cloud computing, Google Map Reduce and Apache Hadoop provided solutions to these problems to a great extent. Big Data is one of the important concepts in today's era as it has provided solutions for solving problems of both human being and machines.

Emergence of Big Data in Learning

Nowadays way of learning has undergone lot of changes. Learners preferred to learn using online communities like discussion forums, online chats, instant messaging. Students preferred using smart phones due to its low cost and easy availability of learning content. Learning management system generates huge volumes of data which helps in improving learning experience of the learners. Big Data techniques provide solutions to process educational data. Big data helps in providing new way of designing, analyzing and visualization of data. Visualization helps in viewing educational data in different patterns which may not be possible otherwise through conventional methods of teaching. It helps them in prediction of many useful patterns. It also helps the learners in collection of bulk of data at minimal cost. From the last few years many online research tools are available which helps the researchers in doing research work. Data Science provides set of principles that helps in extracting knowledge which further helps in predicting results and taking decisions.

Review of literature

Due to advancements in technology there has been a great shift from last few decades (Miftachul Huda et al.). Survey proved that more than 42% of the total population is using smart phones. Usage of these devices has been increasing year by year (Shivam Gupta). We are greatly depended on the information and communication technology to get information from all around our surroundings (Miftachul Huda et al.). It has brought a great change in our way of living and thinking.(Wenxia Pan). The traditional way of learning in the class rooms were based on three different types of models which includes constructivist, behavioural and cognitive models (Katrina Sin et al). It was not an easy task for teachers to give a proper guidance to the students in conventional classrooms (Wenxia Pan). "Connectivism", the model by Siemens suggested that learning and understanding of concept can be enhanced by exchanging the knowledge with others through networks (Katrina Sin et al.). The continuous advancements in technology have lead to the development of new idea, Smart learning. Smart learning has provided the personalization and versatile processing environment (Hisham Elhoseny et al.). Due to large amount of data available in educational institutions and also data available from

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different social medias there is a need of technique that could handle it efficiently and useful patterns can be visualized from it(Ben Kei Daniel).

Benefits of Big Data in Learning

Big data is used in a variety of ways in different learning applications as

Huge Amount of Learning Resources

Big Data helps in providing a lot of online writing material. Learning material is available in different modes as text, audio, video etc. It helps the students in getting diverse knowledge and guidance. It focuses on personalized learning and students can choose material accordingly.

Helps in Finding Solutions of Hard Questions

It helps in cracking the tough questions which would not be possible otherwise. The whole information is available through online resources which help in providing answers to many questions as what, how, when and where.

Student Centric Teaching Approach

Teachers can adopt their teaching plans, teaching methods, teaching progress according to aptitude of the student and it varies from one student to another. Teachers build online environment in classes that helps in enhancing the knowledge of the students. It helps in solving problems in classrooms and also helps in getting feedback in real time.

Interactive Evaluation Mechanism

In traditional teaching as there were many students in the class, teacher has to face the problem in accessing and providing in depth feedback to the students. But now a day's many automatic evaluation systems were developed which can give a score within a seconds and gives personalized assessment.

Customize Programs

Individualized programs can be created according to the capabilities of the students. Through these programs they can learn at their own pace and can move towards their personalized goals. It helps in improving the overall performance and learning experience of the learners.

Learning from The Results

It helps in predicting unusual behaviour in learning. As today many tools and techniques are available online which helps in analyzing of learning behaviour of students/learners and adjust the programs accordingly. Big data analyze the performance of the students and is successful in finding jobs for them accordingly.

Tools and Techniques

Different techniques used in educational data mining that helps to overcome the difficulties faced in processing Big Data are:

Regression Analysis

It is used to determine the influence of dependent variables when changes are made in independent variables. Example how customer loyalty is affected by satisfaction level of customer.

Association Rule

It is used for determining interesting relationships among large databases.

Classification

It is a method of statistical classification. It is used to determine different categories to which a

value belongs to. Example develops profile of students who takes different online courses.

Clustering

It helps in identifying the distance between n-dimensional variables by grouping of records.

Genetic Algorithms

It is used to evolve useful solutions to the problems that require optimization. It is used to determine useful combination of optimized materials.

Machine Learning

It focuses on making predictions based on properties that learn from "training data". Example it learn preferences of learners and gives recommendations based on it.

Open Source Tools

Several Open Source tools are available that helps in managing Big Data. Some of the tools are:

MangoDB

It is distributed database. It stores data in flexible format like JSON documents. It provides powerful way for accessing and analyzing the data. It is one of the leading NOSQL database.

Hadoop

It is one of open source tool that can be modified according to developer wish. It divides data into small sets so that it can be stored on different servers at a time.

MapReduce

It is one of the programming tools which is used for processing of huge data. It is very beneficial for performing large scale analysis on multiple machines using clusters.

Orange

It is one of data mining technique. It is used in teaching for providing hand-on-training and visual illustration of concepts across the world.

Conclusion

The goal of this paper was to introduce the concept of big educational data to the readers. It has created unique opportunities for the researchers by introducing different techniques to process and support student learning. As huge amount of educational data is continuously generated through online sites, smart phones etc application of Big Data techniques becomes the need of time in learning environment. This paper discussed advantages to transform information into innovative learning environment. Big Data brings opportunities for independent learning, real time feedback and diversified evaluation. Thus learners must be fully prepared for making bold innovations in teaching modes, teaching methods and evaluation methods by considering several issues of Big Data.

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P: ISSN NO.: 2394-0344

RNI No.UPBIL/2016/67980

VOL-3* ISSUE-11*(Part-2) February 2019

E: ISSN NO.: 2455-0817

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