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Implementation of Big data analytics in Education Industry

Ms. Manju Sharma[1], Ms. Shazia Ali [2], Dr. Sadia Husain [3]
College of Computer Science & Information Systems,
Jazan University, Jazan Kingdom of Saudi Arabia. [1,2,3]

Abstract: *The fast growing numbers in data and information in the current IT world is facing the tsunami like situation. The increase in the number of end users need the secure and reliable model to handle the situation. Big data and cloud is the best solution to handle such situation. Virtualization has completely changed the storage concept. It makes great change in industries like education, healthcare and finance sectors etc. Mass prefer to use virtual storage in place of actual one. In this paper we will analyze how big data is helpful in the field of education.*

Keywords: *Big data, Cloud , cloud vendors, Education Industry, open data.*

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I. Introduction

In this paper we will discuss about Big Data and open Data in various fields specially in Education field. In section II we discussed Importance of Big Data. Section III we discussed Cloud enabled Data how cloud help us in keeping records. In section IV we explore how Big Data helps in Education Industry.

Big Data can be described as a massive volume of structured and unstructured data which are so large and very difficult to process this data using traditional methods and recent software technologies. [2]. Cloud computing simply performs a desired computation (mostly on big data) on a remote server that a subscriber has configured and controls, rather than on the subscriber's local desktop PC or tablet. The leading commercial cloud computing provider's includes: Amazon EC2, Microsoft Azure, and Google Compute Engine (still in beta). The service charge, charged by Cloud computing providers for using their platforms go as little as $0.10 per CPU-hour for renting MIPS, memory, and disk space and other services [3].

Real time applications of big data in different industries like healthcare, network security, market and business, sports, education systems, gaming Industry, telecommunication. Big data technologies process high-variety, high-volume and high-velocity to extract data value and ensure high-veracity of original data [5]. Devices and people are constantly generating data. In IT industry big data is a largest buzz phase. The data has increased day by day from last twenty years; some facts about data are 2 million searching queries on Google, 277,000 tweets, 100 million emails, and 350 GB data processing on facebook every minute [4].

The data is tremendously increasing day today leads to a Bigdata. The advancement in Big Data sensing and computer technology revolutionizes the way remote data collected, processed, analyzed, and managed in effective manner[12]. Big Data are normally generated by online transaction, video/audio, email, number of clicks, logs, posts, social network data, scientific data, remote access sensory data, mobile phones, and their applications [8] [9].

Existing cloud monitoring services such as Cloud-Watch, Azure-Watch, Nimsoft, and Nimbus are delivered by cloud service providers as part of the Infrastructure as a Service (IaaS) model[1]. They can be launched within an integrated cloud management console. To some extent, these services have a limitation in supporting analysis such as workload forecast and pattern matching beyond the simple built-in aggregation[11].

II. Importance of Big Data

The government's emphasis is on how big data creates "value" – both within and across disciplines and domains. Value arises from the ability to analyze the data to develop actionable information. The survey of the technical literature [5] suggests five generic ways that big data can support value creation for organizations.

1. Creating transparency by making big data openly available for business and functional analysis (quality, lower costs, reduce time to market, etc.)
2. Supporting experimental analysis in individual locations that can test decisions or approaches, such as specific market programs.
3. Assisting, based on customer information, in defining market segmentation at more narrow levels.
4. Supporting Real-time analysis and decisions based on sophisticated analytics applied to data sets from customers and embedded sensors.

5. Facilitating computer-assisted innovation in products based on embedded product sensors indicating customer responses.

III. Cloud Enabaled Big Data

Cloud Computing: Cloud computing, the word Cloud (also phrased as "the cloud") is used as a metaphor for "*the Internet*," so the phrase *cloud computing* means "a type of Internet-based computing," where different services — such as servers, storage and applications — are delivered to an organization's computers and devices through the Internet[13]. Instead of installing a software suite for each computer, this technology requires to install single software in each computer that allows users to log into a Web-based service and which also hosts all the programs required by the user. There's a significant workload shift, in a cloud computing system [10].

The cloud consists of terrestrial servers across the internet that collectively manages store and process data. Cloud computing is use of resources (software and hardware) that are delivered as a service over the internet or other network. Cloud computing is a paradigm of service oriented computing. Three most popular cloud computing models include: Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Software as a Service (SaaS) [15].

1. SaaS: It provides the complete application to a cloud end user. It is accessed through a service oriented architectures and web portal based on web service technologies. The services seen on an application layer as an extension of ASP (Application service provider), in which application is maintained, run and supported by a service vendor. Examples of this are Gmail, Hot mail and online banking.
2. PaaS: It is an environment for provisioning and developing cloud applications. Benefits for using PaaS include the ability to upgrade or change and minimize expenses and streamlined version development and the main risk of PaaS is centralization requires different/new security measure. The popular PaaS is google app Engine.
3. IaaS: Infrastructure layer access the IT resources services (data storage resources, computing resources and communications channel) combined under the IaaS. Physical resources are abstracted by visualization; they can share several operating systems and end user environments on the virtual resources (CPU, RAM).

The cloud combines servers into large computing pool and divide the single server into multiple virtual machines. There are three types of cloud exist [7].

1. Public cloud: Public cloud computing model in which services (storage and applications) are use over the internet. It may be based on a pay-per-usage mode [16].
2. Private cloud: Private cloud is internal data center not available publically but operates within a firewall [16]. There are two variations of private cloud: on-premise private cloud and extremely hosted private cloud. An info-tech survey 76% IT decision-makers will focus on private cloud.
3. Hybrid cloud: It is a mix of public and private cloud. Hybrid architecture requires both on-premise resources and off-site server based cloud infrastructure.

IV. Use In Education Industry

By using big data analytics in field of education systems, remarkable results can be seen [18]. Data on students online behaviour can provide educators with important insights, such as if a student requires more attention, the class understanding of a topic is not clear, or if the course has to be modified. Students are required to answer accompanying questions as they go through the set of online content before class. By tracking the number of students that have completed the online module, the time taken and accuracy of their answers, a lecturer can be better informed of the profile of his students and modify the lesson plan accordingly. The analysis of data also clarify about the interest of student looking at time spent in online textbook, online lectures, notes etc. As result instructor can guide choosing the future path effectively.[17] [18]

From the Year 2012, about 2.5 Exabyte of data are produce each day, and that number is doubling every 40 months or so. More data cross the internet every second than were stored in the entire internet just 20 years ago. This gives businesses a possibility to work with many potables' of data in a single data set and not just from the internet. For example, it is approximated that Walmart collects more than 2.5 petabytes of data every hour from its customer transactions. A petabyte is one quadrillion bytes, or the equivalent of about 20 million filing cabinets' worth of text. An Exabyte is 1,000 times that volume, or one billion gigabytes [19]

Benefits of Big Data and Open Data in Education [20]:
1.Improved instruction Can improve students' performance and learning abilities making the lessons more personal. The courses can be adjusted from the teachers with the help of analytics.
2.Matching students to programs Open Data are able to help parents and students to find the best school or educational program.
3. Matching students to employment Companies and candidate employees can discover
alternative and more effective tools to use open data to qualify their skills with the needed skills. Also students can find and make applications for jobs which can match with their abilities, more efficient than before.
4. Transparent education financing. This leaves to students to participate in education
activities, which previously they don't have the ability. Furthermore are able to choose
anything about higher education and to discover the most proper education programs for them.
5. Efficient system administration School education systems are able to develop a skillful school supply which can help administrators to allow more Big Data and Open Data.

As McKinsey Global Institute mentions Big Data refers to data sets that are voluminous, diverse, and timely. On the other hand Open Data is actually Big Data but smaller and
the information is open to everyone [20]. As we can see Open Data comes mostly from Government data sets or other institutions and enterprises, and from individuals. Actually the public sector feeds the Open Data and in the public sector includes schools, Universities and other Educational Institutes [20]. Finally, the open data concept is associated with "MyData," which involves sharing information collected about an individual or organization with that individual, such as hospitals [20].

V. Conclusion

We can say the storage like big data and open data has captured the storage market which will improve by leaps and bounds in near future. In spite of having drawback like fear of security and privacy the virtualization has become most favorite for business and industries. where use of hand held devices and Iot has increased, secured virtualization can be a solution to the threat to information security.

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