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## **Future of Big Data**

## Ms. Priya Chaudhari<sup>1</sup>, Ms. Binita Patel<sup>2</sup>

<sup>1</sup>Final year Student B.E., Department of Computer engineering, SVIT Vasad, Gujarat, India <sup>2</sup>Final year Student B.E., Department of Computer engineering, SVIT Vasad, Gujarat, India

**Abstract** – As quoted by CNBC – "Data is the new oil". Big data has become a business issue or at least an issue that business people are aware of. Due to the advancement of new technologies, devices, social media, the amount of data produced is growing rapidly every year. For instance, The Large Hadron Collider, when operational last year, generated 1GB of data per second. The amount of data produced by mankind from the beginning of time till 2003 was 5 billion gigabytes. The same amount was created in every two days in 2011, and in every ten minutes in 2013. This rate is still growing enormously. Big data is a collection of large datasets that requires advanced tools, techniques and frameworks rather traditional computing techniques. Big data is evolving rampantly at science symposiums, playing a most vital role across industries and business firms. As a result the data are mined for deeper insights and improve business functions, sales, customers review and satisfaction, privacy and security.

*Key Words*: Big Data, Hadoop, Cyber security, Machine learning, IoT, Cloud, Spark

### 1. INTRODUCTION

Almost everyone has agreed that a big data has taken the business world by a storm, but what's next? Will data continue to grow? What technologies will develop around it?

Big data has provided firms and institutions with better sources for analysis, marketing, business decisions, as well increasing the ability to see those pressure points and correct issues before customers are even aware of them. Although, with more data points being collected from customers, and employees, more and more firms are facing the challenge of how data can be retrieved and analyzed faster and more efficiently. The concept of big data fabric helps firms to address these problems in a way to store, analyze and stream data that will be efficient to retrieve actionable information and leverage the value of the data that we get from customers. Data will continue to grow, considering that the number of hand handled devices and Internet-connected devices will grow exponentially.

#### 1.1 Challenges

- Store, handle, analyze
- Increasing volume
- Security

Integrating collections of data to yield actionable information

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- Employing advanced tools to manage and retrieve data efficiently
- Staffing shortages
- Forecasting trends

### 2. Trends and Predictions of Big Data

It's clear that the big data market will grow but how organizations will be using this big data is not that clear. Along with current technologies new technologies will be surfaced to improve the big data market. Below are some trends that are likely to shape the big data market in future:

- 1. Open source
- 2. Machine Learning
- 3. Edge Analytics & Computing
- 4. Predictive Analytics
- 5. Cloud Computing
- 6. Intelligent Security
- 7. Job trends

#### 2.1. Open Source

Open source applications like Apache Hadoop, Spark, R programming, Map reduce and more are dominating the big data space. Hadoop has quickly become synonymous of big data, but it is difficult to master hadoop, therefore lots of projects have failed; but now there is Spark, and Hadoop has come quite a long way. Hadoop is becoming affordable general purpose solution. But spark, a new framework is almost 100 times faster than hadoop. Whereas, R is a programming language and software environment for statistical analysis, graphical representation and reporting.



Fig-1: Open sources of Big Data

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#### 2.2. Machine learning

Machine learning is basically a branch of Artificial Intelligence which helps computers to analyze stored big data and comes to a conclusion without being programmed explicitly. According to world's prominent IT research companies like Gartner and Ovum predictions has been made that machine learning will be an essential part for data preparations and predictive analysis for profitable business. Classification of machine learning:

- Supervised- task driven
- Unsupervised- data driven
- Reinforcement- algorithm that learns to react to an environment



Fig-2: Machine Learning

#### 2.3. Edge Analytics & Computing

Edge Computing is data processing at the edge of network whereas Edge Analytics is data analysis at the edge of the network. The Internet of Things (IoT) is supposed to have considerable impact on big data. This IoT big data of companies is dealt with the help of latest technology called edge computing. It improves performance by reducing the data flowing over the networks and also saves cloud computing cost. In situation where data is routed inefficiently or delays occur, Edge Analytics can be used to solve these issues. Also, rather than using polarized systems in which raw data is sent to data warehouse where it is cleaned and analyzed, systems which can perform these tasks at the edge of system are more productive. Bringing analytics to data is a principle that makes edge analytics an enticing topic. For instance, a massive scale CCTV security system, with thousands of cameras covering a large area. It is better if the images captured by the cameras at the moment could be analyzed themselves and data which is useless can be marked as low priority or discarded, so that it can avoid generating expense as well as compliance burdens.

## 2.4. Predictive Analytics

Predictive analytics is a branch of advanced analytics which is closely related to machine learning. It predicts the

unknown future events by analyzing big data. It is gradually spreading its roots to areas like operational intelligence, business intelligence, financial planning and many more. According to a survey from PwC of 2016, only 29% of the organizations are using predictive analysis. However, the numbers are expected to grow in coming years.

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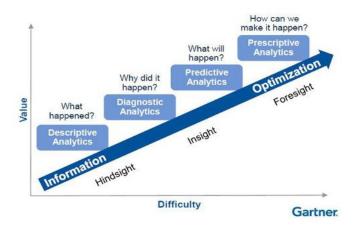


Fig-3: Predictive Analysis

#### 2.5. Cloud Computing

Cloud solutions are vastly scalable and hadoop technologies are allowing data to be analyzed within the cloud which provides a cheaper solution and allows businesses to manage their infrastructure and manpower. Together with hadoop, MapReduce and Pig, Hive have emerged which makes feasible processing of huge data sets. This provides secured, automated and huge performance services. Together the cloud computing and big data are proving to be of great help to business firms and governments to concentrate their resources on core functions. Therefore, they can allow working with huge unstructured data. Also, the future beholds educing business value from a pool of data from cloud. Spending on Cloud-based Big Data and Analytics technologies will grow 4.5 times faster than spending on-premises Big Data and Analytic (BDA) solutions by 2020 according to IDC. They also are expected to absorb and process huge amount of IoT data and become a mandatory addition for the cloud.

## 2.6. Security

Gartner predicts that by 2018, business ethic violations will contain 50% of data violations; therefore, big data will have huge challenges in regards to privacy. Due to the increasing dependence and digital technology, cyber-attacks have become more common with each passing day. TO combat against the cyber-crimes, enterprises are headed towards big data analytics into their security strategy. Security log data provides hoard of information about the past attacks which can be used to predict, prevent and alleviate future attempts. Some firms are joining there securing systems with big data

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platforms like hadoop whereas others are dependent on vendor products that include big data analytic properties. As reported Cybersecurity Ventures, cyber security expenditure will exceed \$1 trillion from 2017 to 2021.

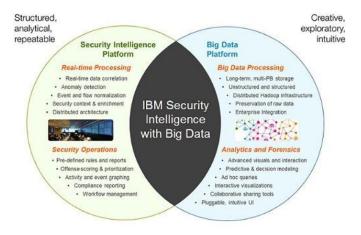


Fig-4: Intelligent Security

### 2.7. Job Trends

Due to increased demands there is need to bridge the talent gap in data analytics. Therefore, academic institutions are compiling degree programs in data science, boot camp style schools are providing training in marketable skills. According to an industry estimate data scientist will receive twice the remuneration received by a programmer. Also companies are more likely to appoint chief data officers (CDO).

DATA/DATABASE ADMINISTRAT	TION (B)		
Big Data Engineer	\$129,500 - \$183,500	\$135,000 - \$196,000	5.8%
Database Manager	\$118,000 - \$170,500	\$122,250 - \$177,000	3.7%
Database Developer	\$103,250 - \$153,250	\$108,000 - \$161,500	5.1%
Database Administrator	\$ 95,750 - \$142,750	\$ 98,500 - \$ 148,500	3.6%
Data Analyst/Report Writer	\$ 74,500 - \$114,500	\$ 77,500 - \$118,750	3.8%
Data Architect	\$127,250 - \$175,500	\$131,250 - \$184,000	4.1%
Data Modeler	\$106,750 - \$155,500	\$111,000 - \$161,500	3.9%
Data Scientist	\$109,000 - \$153,750	\$116,000 - \$163,500	6.4%
Data Warehouse Manager	\$123,750 - \$172,000	\$129,000 - \$179,000	4.1%
Data Warehouse Analyst	\$105,000 - \$152,000	\$107,500 - \$155,750	2.4%
Business Intelligence Analyst	\$113,750 - \$164,000	\$118,000 - \$171,750	4.3%
Electronic Data Interchange (EDI) Specialist	\$ 76,500 - \$115,500	\$ 77,500 - \$118,750	2.2%
Portal Administrator	\$ 94,000 - \$134,250	\$ 96,000 - \$ 138,750	2.8%

Fig-5 Predicted Salaries

#### 3. CONCLUSION

Gartner predicts that by 2020 big data and Internet of Things will be used to reinvent, digitize and eliminate 80% of business processes. Therefore, the impact that big data will have on various businesses cannot be overlooked. To truly uncover the power of big data, organizations must identify how to use their data to build reporting and analytics for

their operations. Studying all the latest leading big market analysis and research, it can be assumed that 15% of IT organizations will move to cloud based service platforms and service market is anticipated to rise about 35% by 2021. Summarizing, Peter Sondergaard, Senior Vice President of Gartner Research famously stated, — "Information is the oil of the 21st century and analytics is the combustion engine"...

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