

# BIGDATA ANALYSIS ON METHODS AND TOOLS

Dr C K Gomathy-Assistant Professor, Department of CSE, SCSVMV Deemed to be University, India

Ms. P.Sravani, Ms. R.Ruchitha, Ms. S. Haritha, Ms. S. Sree Chandana

UG Scholars, Department of CSE, SCSVMV Deemed to be University, India

## ABSTRACT

As the name of denote, huge information suggests that an excellent assortment of knowledge that can't be continue while not ancient computing approach. To reason the information, it would like tool and technique. Having information larger consequently needs totally different approaches, techniques, tools & architectures to manage the information in an exceedingly higher means. huge information technologies give additional authentic analysis that facilitate in deciding. To manage and huge amount volume of structured semi-structured and unstructured information you'd need an that it desires so as to perform which will be assured, privacy and shield the information. There are varied tools and technologies within the market from totally different vendors IBM, Amazon, Microsoft, etc., to pick up the huge information. the key challenges with huge information are Capturing information, Storing information, Searching, Curation, Sharing, Transfer, Analysis, Presentation, to satisfy the on top of challenges, organizations commonly take the assistance of venture servers. Multiple methodologies (technologies/methods) supported sure parameters to draw that of them is absolute best (optimal) or what else has to be done, to own AN optimum resolution. because the information is being created and collected at a awfully high speed with diversity additionally to that, process has become a unexciting task. Whereas the actual fact remains that, by process of this information we'll uncover gold from these Brobdingnagian mountains however if it's

left untreated it'll become Everest's of refuse. Since the start of term huge information several strategies and or technologies ar gift that ar being employed to procedure these information mountains. These technologies have their own space of interest because of that there are plain disadvantage and mode of operations between them. when analysis we have a tendency to establish that common to them is low activity and therefore the information management. Once the information Management to produce the Cloud technology.

**Keywords:** Bigdata, bigdata tools and methods.

## 1. INTRODUCTION

For each second the world sees huge and large amounts of data that is growing exponentially, being generated, acquired, stored as data, and analysed. It allows exchange of data between various electronic devices like computers, laptops and humans. With the usage of Internet the revolution in the generation of massive data amounts happens. Taking this into consideration, the following fields are mentioned: mobile phones, social media like Facebook, twitter, imaging technologies to determine a medical diagnosis, etc. The volume of available data continues to grow and it grows in different formats because of the usage of data. As a result, the price of storing data continues to fall which results in data storing being more reachable, and cheaper. In spite of the fact that creating data storage is getting cheaper and more available, the increasing data in volumes and in different formats and from

sources creates new problems regarding to data processing, includes analysis and in business decision making processes also used in integrating big data.

While to store and process Big Data, new technologies are addressed to address these problems. To deal with these requirements of today's world, there is a need for a new approach such as building a reliable and user understandable structure and architecture. The purpose of this study is to navigate the domain of the Big Data problem; particularly, to create an overview among free available repositories of biomedical Big Data and methods along with their limitations and use cases to be applied over the chosen data and to discover technologies.

### 1.1 Big Data overview

There are so many perceptions regarding to Big Data. Somebody explains Big Data as data that is quite complicated and hard rather than "easy" and to acquire, store, manipulate and process it one will feel that as hard, because of the fact that it is "big". Another one, which is regularly mentioned and used is called "3V" described by three words (Volume, Variety and Velocity). These definitions are mentioned below:

"Big Data is referred as volumes of data which includes complexity, generates the data at different velocities, insights and the data is ambiguous, that can't be done using traditional technologies, processing methods, tools and algorithms."

The well-known and famously used definition is originally referred as "3V". Many authors have introduced different definitions related Big Data. The all V's are described below:

**1.1.1 Volume** – data increases exponentially that are in volumes. There are so many sources and resources which generates a huge amount of data. It takes long time to process those exponentially generated data.

**1.1.2 Variety** – the acquired data is not always the structured data. Big Data is not always structured data. Most of the parts are unstructured. In addition, it comes in different formats because it is collected from various data sources; it end it increases the complexity of storing and analysing.

**1.1.3 Velocity** – It describes the rate of data change. In real time there is a need to manipulate with data. In the fields of business and healthcare, it can be somehow demanding.

**1.1.4 Value** – it is often argued that the value is the most critical part of Big Data, Insights. To store data for IT infrastructure systems it costs a lot of money.

**1.1.5 Veracity** – not all data has to be perfectly structured and good, to give relevant sight it has to be perfectly good. After considering the errors rate and the data incompleteness, ambiguity in the dataset is needed and useful for the further data analysis. Another aspect of data veracity is credibility.

### Big Data Characteristics

1	VOLUME
2	VELOCITY
3	VARIETY
4	VARIABILITY
5	VERACITY

Fig 1: 5 Vs in big data

### 1.2 Big Data evolution

To better perceive what massive information is and wherever it comes from, it's crucial to 1st perceive some past history of information storage, repositories and tools to manage them. As shown in Figure, there has been an enormous increase of information volume throughout the last 3 decades. As we will see within the decade

of Nineteen Nineties the info volume was measured in terabytes. Relation information bases and information warehouses representing structured data in rows and columns were the typical technologies to store and manage enterprise info. resulting decade information started addressing totally different types of information sources driven by productivity and publication tools like content managed repositories and networked connected storage systems.

### ***1.3 Sources of data***

Supply of information usually, the primary kind is certain up with the unfold of machines digitalization that is expounded to sensors integration, the property increase, and devices recording sounds, pictures or videos and to machines communication between one another. notably, devices like cameras recording videos, cell phones grouping geospatial information, machines in production lines of commercial systems, ar exchanging necessary info whereas process their activities. additional examples ar mentioned below: Medical info – machines recording electroencephalogram (Electroencephalography), heartbeats, genomic sequencing. multimedia system – photos and videos uploaded on the web, Mobile devices – give geospatial information (location, gyroscope), yet as information regarding phone calls, messages, net usage and information gathered by mobile applications, alternative devices – Warehouse Management Systems (WMS) providing within location completed by Wi-Fi, identification of keep product or material by BAR, QR (Quick Response) codes or RFID (Radio-Frequency Identification) chips. there's a presence of the many alternative technologies like navigation systems, seismal process, etc. Itis acceptable to contemplate alternative sources generated by activities on the web generally. allow us to imagine having a collection of servers that run web content which will be determined for retail business. The

servers will collect records of all activities of the websites' customers, users, transactions, applications and servers' own activity and behaviour. as an example, there ar logs which may be collected.

### ***1.4 Characteristics of big data***

Massive knowledge In respect to the definitions, the explanation why there is intense complexness in process massive knowledge is shown. Along with the large knowledge there conjointly exists ambiguity, viscosity and virality (see Figure). Ambiguity – emerges once there's less or no metadata in massive knowledge. Associate in Nursing example are often a graph or something that typically desires an outline. Letters Mand F in a very graph will depict genders or they'll even represent Mon and Fri. Viscosity – this term is usually wont to describe the latency time within the knowledge relative to the event of being described. Virality – describes however quickly knowledge is shared throughout a network among people that square measure connected. The measure result's the speed of spread of information in time. for example, Twitter are often a relevant example once the tweets square measure spreading from the first (root one) original tweet among individuals throughout the network.

## **2. BIGDATA TOOLS**

Although Big Data principles and applications are frequently discussed in the bigdata tools, there are not many technologies which are convenient to deal with such type of data. Due to the definitions of the volume and velocity, the tools which are required to deal with Big Data have to offer a distributed computing approach. These are the approaches of multiple data and single program, and single data and multiple programs. In the first case, there is single program, which is run on more nodes, where all nodes are to process on different data nodes. On

the opposed, the second case is observed to have only one dataset, which is processed by a program divided on small tasks that are run on different nodes in parallel. Due to it, there are tools that try to theoretical from the physical distribution as much as possible. Since the Apache company released its new implementation of Map Reduce pattern, a whole ecosystem called Hadoop has started progress. The MapReduce pattern offers the means to break a large task into smaller tasks, run in parallel, and combine the outputs of the individual tasks into the final output. The significant ecosystem of bigdata is to expansion was caused by using simple programming models to process and large datasets across the clusters and as well as amplified by the fact of that whole solution has started as open-source software. Hadoop is the first publicly known and as discussed technology of Big Data processing has been used to the base of open-source extensions. In other words, most of the Big Data tools are based on Hadoop solution. These solutions is to offer those methods and approaches to load, pre-process, store, query and analyse data.

### **2.1 Map Reduce:**

As the name mentioned earlier, the MapReduce paradigm provides to interrupt associate degree outsized task into smaller tasks, run the tasks in parallel and to combine the outputs of the individual tasks into the final word output. MapReduce consists of two parts a map step and a reduce step. Map – performs Associate in Nursing operation to a small amount of data that generates some intermediate output. reduce – it will collect the intermediate outputs from the map steps, processes it and provides the collected final output. the foremost advantage of MapReduce is that the use distribution over a cluster of computers (to run tasks in parallel). notably, MapReduce provides a way, that

allows the method of one portion of the input which can be run severally of the other input elements. In different words, the use is going to be merely distributed over the cluster.

### **2.2 Distributed organization – HDFS**

The Hadoop Distributed organization (HDFS) is also a organization that gives the potential to distribute data across a cluster to want advantage of the data processing of MapReduce. HDFS is meant to run on common inexpensive hardware. Consequently, it means there isn't any have to be compelled to deploy it entirely on super computers. Although, it's enforced in Java, HDFS are going to be deployed on an outsized vary of machines with the exception of a node, that's dedicated to managing namespace services.

### **2.3 MapReduce Job in Hadoop**

A typical MapReduce program in Java consists of three [of three] classes: the driver, mapper and reducer. the driver – contains the work details and its configurations like input file locations, details for assignment the input file to the map task, the names of the mapper and reducer Java classes and it to boot contains the position of the reducer task output. The mapper – represents the logic to be processed on each data block related to the printed input files inside the driving force code. The reducer represents the logic of gathering intermediate results from the mappers.

### **2.4 The Hadoop ecosystem:**

Theme As mentioned on prime of, Hadoop evolution comes all along with open provide and business extensions to make Apache Hadoop easier to use and provide more usefulness and choices. This subchapter examines the following Hadoop-related Apache comes that each one promptly kind the Hadoop theme.



## **2.5 Spark**

It's Associate in Nursing open provide immense process framework for acting data analytics on a distributed computing cluster like Hadoop. Spark supports in-memory method to increase speed and knowledge methodology over MapReduce. it's mentioned as a tons of powerful analysis replacement of Hadoop. Spark is deployed on the best of existing Hadoop cluster that enables Spark to access data via HDFS. additionally, it can also methodology structured data via Hive and stream data from HDFS. [13]

## **3 BIG DATA TOOL SELECTION**

### **3.1 Storage**

Nowadays, there are 2 databases wherever the info is being hold on inside the virtual machine that has a hundred GB allocated. As results of the info analysis, while not external stimuli the info volume can in all probability reach the extent of one TB in more or less the year 2032. this knowledge storage system is enough for next following years. Most of PostgreSQL info size is occupied by binary files, which cannot be queries. With this in mind, there's no got to exchange this RDBMS for alternative a lot of scalable technology such as a distributed classification system. Moreover, the data of experiments ar presently being hold on in a very NoSQL info where it will be queried in a very a lot of economical manner.

### **3.2 Pre-processing and Analysis**

As aforementioned before, the entire method of research is performed either inside Matlab alongside EEGLAB or by applications written in Java.

### **3.3 Hadoop based solution**

Most of technologies providing a scalable answer for coping with massive knowledge ar

supported Hadoop. Due to the fact that Hadoop is enforced in Java, it provides appropriate API that allows writing distributed Java programs primarily based on MapReduce paradigm. Hadoop is constructed on its distributed classification system HDFS. HDFS solution isn't economical once the classification system is meant to deal with a large quantity of tiny files wherever a little file is the file that is smaller or virtually up to the dimensions of block

(default sixty-four MB). With this in mind, we are able to state that this solution couldn't be economical within the domain of the EEG/ERP because the dimensions of the foremost of the info files is a smaller amount than twenty-seven MB in sixty-three you look after cases. Moreover, the remaining rest thirty seventh of other files have totally different sizes, it means, which suggests, that if it they were hold on in HDFS, most of the files wouldn't fill HDFS blocks befittingly thanks to its inner fragmentation though Hadoop provides some approaches the way to deal with tiny files, neither of them is convenient to be applied in this context. the method of the info generation cannot be changed as a result of the generated files are related to particular experiments. Similarly, an equivalent downside would occur if we have a tendency to use the tactic of batch file consolidation. Sequenced files technique appears to be higher, but if we consider that we'd wish to run a technique over the dataset of one experiment, it'd not be economical either as a result of one map operation is run over one knowledge block, wherever the files of one dataset may be hold on anyplace. In general, the solutions supported Hadoop don't seem to be acceptable massive knowledge project. Moreover, there's no got to store knowledge in a very distributed classification system.

### 3.4 *MAT Lab*

MATLAB provides variety of techniques and approaches to handle huge knowledge. Though their square measure tools such which change to upset issues that occur once an oversized data should be loaded into a computer's memory promptly, they are thought of as a way that provides a scalable solution. This practicality is enabled by Parallel Computing Toolbox in conjunction with Distributed Computing Server that provide a scalable distributed resolution. This resolution permits to run strategies for knowledge pre- process and analysing over a scalable MATLAB cluster.

### 3.5 *Evolution*

A MATLAB cluster appears to be the most effective resolution for the application of a giant knowledge approach among the EEG/ERP project. Moreover, the researchers square measure conversant in this environment, that contains several on the market strategies for data pre- process and analysis programmed as by EEGLAB plugin that is wide used among this community.

## 4. BIG DATA EVALUATE PROCESS

The characteristic of Bulk Data was original describe in 2001, when bunco identify trey key attribute of bulk data amounts: high variety, volume, and velocity. To data, theses attribute has become the define characteristic of Bulk Data. However, contemporary authors and business specialists enlarged these defining characteristics with farther aspect such as firm holding, authority, and analysis techniques. Farther amendments to the definitions include the additions of a four V, veracity, by IBM emphasizing the aspect of data quality. Taking this different extension of the native report into account, we definitions Bulk Data as a phenomenon characteristic by an ongoing increases in volume, variety, velocity, and veracity of data that required advances techniques and technology to capture,

reserve, issues, manages, and analyses these data."Big data" merge for a variation. of new and exist data to sake real business benefits. But process many or wide variety of data remain merely a technology solution unless it is tied to business object and objective. "Big Data, Big Change: In the money Management" In recent years, "Big Data" has attracted increases attentions. It has already proved its note and value in several areas, such as aerospace research, biomedicine, and so on. In "Big Data" obtain along down which is be in swag by agreement, business records, business accounts and predictions may spring to life. This paper makes an analysis about what is change that "Big Data" bring to Accounts Data Process, Comprehension Budgets Managements, and Management Accounts throughs affects the ideas, functions, modes, and method of money managements. Then the papers state the challenges that "Big Data" bring to enterprise aim to illustrates that only through fostering strength and circumventing weaknesses can an enterprise remain invincible in "Big Data" era.

**Aicha ben salem, faouzi boufares, sebastiao correia** publish in April 2014 "Semantic Recognition of a Data form in Bulk-Data" In facts, quality expecting data permits improve interchange between employee of one or company Data quality represents a great challenge. because the cost of decent can be very high amount. Therefore, the use of data grade becomes an outright necessary within an organization. To improve the data consistency in a Bulk-Data source, our purpose is to adding semantics to data and help users to recognizes the Big-Data schemas. The originalities approaches lie in the semantics aspects it offers. It detects issues in data and proposes a data schema by applying a semantics data profiles.

## 5. CONCLUSION

Alternating sees a huge size of amount of data being generate again by human co-operation or by machine which are all enclosing us. The duration of Big Data has come and there is a require labelling the challenge which progress in consequence with it., the solution of Big Data is wide discuss many books and journal have been publishes to address its challenging, defined and recommendation on how to dealing with it. Moreover, the terms such as isolation, reliability and moral solutions are also considered. Although the Big Data is a frequent discuss topics in abstract manner, there is deficiency in publication and source dedicate to its practical usage. however, there are some evolve technology such as Apache Hadoop along with its environment. This technology is considered as the open-source software and broadly used Big Data technology, build upon a distributes filesystem and an implement of MapReduce pattern. Most of the other technology dedicate to deal with Big Data are based on the Hadoop blend. Although Hadoop is often discussed as a general Big Data platform, it cannot address all Big Data problems. There are still some available patterns which are not based on Hadoop such as MATLAB, a system which provides a dissimilar speak to of a clump arithmetic run over a share filesystem. Farther, it is suitable to mention where Bulk Data is stored and how much it is availability. Although there are many possible on how to access Big Data of variety types, biomedical data is mostly not much availability. There are exclusive publicity open biomedicine Big Data databases which is intended to preserve genome. On the other hand, due to its many big volume, there is sizeable quality variations between publications where the database is described. Other available databases cannot compute with the high volume of the genetic database. However, they are unmoving characteristics by some quality which should be consider. (Consider revise sentence to make it clearer) even, due to its domain, availability, many publications and information within the investigation, the databases of the EEG/ERP

project were evaluated as the most suitable one. Depend on the EEG data character, which were obtain by the deep database analytics, MATLAB solutions was evaluate as acceptable technologies for application on EEG data. Additional, MATLAB is widely used within the EEG project for the data process and its programming can be deployment over a MATLAB clusters. Although the Computer Science and Engineering Department does not possess all required allowances, there is the possible to use the project where all allowances are available along with countless hardware resources. To verify that a MATLAB clump is a suspension which can be an asset for the EEG/ERP project, a clump which allowed the runs the of a MATLAB programming over multiplying data on a MATLAB clump was creating. The model was tested by performing two use cases, where EEG signal were either divides on epoch or filter over two investigation datasets. This test has shown that the mock-up functionality and can be consider as an asset for the EEG/ERP predict. Additionally, a few recommendations are proposed on how the predict can be improve further.

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***AUTHORS PROFILE:*****RUDRARAJU RUCHITHA**

COMPUTER SCIENCE AND ENGINEERING  
Sri Chandrashekharendra Saraswati Viswa  
Maha Vidhyalaya University.

**SANNAPANENI SREE CHANDANA**

COMPUTER SCIENCE AND ENGINEERING  
Sri Chandrashekharendra Saraswati Viswa  
Maha Vidhyalaya University

**HARITHA SANIVARAPU**

COMPUTER SCIENCE AND ENGINEERING  
Sri Chandrashekharendra Saraswati Viswa  
Maha Vidhyalaya University

**DR.C.K. GOMATHY**

ASSISTANT PROFESSOR IN CSE  
Sri Chandrashekharendra Saraswati Viswa  
Maha Vidhyalaya University

**POTTETI SRAVANI**

COMPUTER SCIENCE AND ENGINEERING  
Sri Chandrashekharendra Saraswati Viswa  
Maha Vidhyalaya University