Chapter 2

Addressing Challenges in Data Analytics:
A Comprehensive Review and Proposed Solutions

Lakshmi Haritha Medida

https://orcid.org/0000-0002-6400-8998
R.M.K. Engineering College, India

Kumar

https://orcid.org/0009-0001-4756-2241
BVC Institute of Technology and Science, India

ABSTRACT

Data analytics, in the context of big data, presents numerous challenges that organizations must overcome to harness the full potential of their data. Risk managers may face a number of obstacles in their efforts to gather and apply analytics. Fortunately, there is a solution. This chapter addresses some of the major problems with data analytics and the probable solutions. The main issues covered in this study are data volume, real-time analytics, data validation, poor data quality, lack of support, ambiguity, financial restrictions, talent scarcity, and security. It will need a holistic strategy that includes strategic planning, modern technology, and cooperative efforts to address these difficulties. Organizations must traverse these challenges to extract valuable insights and make educated choices from their data, from adopting scalable infrastructures for data processing to developing a competent staff and putting in place strong security measures.

1. INTRODUCTION

1.1 Big Data

The widespread use of technology and networked systems in the digital age has resulted in an unprecedented amount of data, which is changing how businesses function and make decisions (*Leadership Challenges in the Digital Age: Navigating Disruption - The Economic Times*, n.d.). Big Data, the term for this era of abundant data, goes beyond typical data processing skills and presents a plethora of potential as well as obstacles. Big Data is the umbrella term for enormous and varied datasets that are larger and more varied than traditional databases. This creates new opportunities for innovation, insight creation, and business transformation.

Volume, Velocity, and Variety are the three Vs that define big data as depicted in figure 1. Every day, enormous amounts of data are produced, including data from sensors, social media, and transaction records, among other sources. The extraordinary rate of data production necessitates real-time processing and analytical capabilities. Additionally, the range of data kinds—both structured and unstructured—presents a complex environment that calls for sophisticated tools and methods for insightful analysis (Elgendy & Elragal, 2014). Big Data frequently encompasses more dimensions than just the three Vs, such as value (the possible insights gained) and veracity (data correctness).

Big Data is now a driving force behind innovation, giving businesses in a variety of industries the ability to streamline operations, make wise decisions, and obtain a competitive advantage. In the corporate world, it powers data-driven strategy, predictive analytics, and tailored consumer experiences. Big Data in healthcare helps with individualized therapies and illness prediction. It helps create smart cities in the field of urban planning. Big Data is having a significant social influence on fields including science, education, and public policy, influencing the direction of a future that is increasingly data-driven.

Big Data has unique properties that demand advanced tools and frameworks to handle in order to fully realize its potential. Distributed computing frameworks such as Apache Spark and Hadoop allow massive datasets to be processed over computer clusters. Scalable storage options for a variety of data kinds are offered by NoSQL databases. Complex datasets may be analyzed with the help of advanced analytics tools and machine learning algorithms, and cloud computing platforms provide scalable and reasonably priced resources for Big Data processing.

Despite the enormous potential of big data (Hariri et al., 2019), companies still have to deal with issues including data security, privacy, and the shortage of qualified personnel. Navigating these obstacles offers chances for creativity, better decision-making, and the creation of sustainable data strategies as the environment

16 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/addressing-challenges-in-data-analytics/343880

Related Content

Applying UML for Modeling the Physical Design of Data Warehouses
Serg Luján-Moraand Juan Trujillo (2008). *Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications (pp. 556-590).*
www.irma-international.org/chapter/applying-uml-modeling-physical-design/7664

Evolution of ArchiMate and ArchiMate Models: An Operations Catalogue for Automating the Migration of ArchiMate Models
Nuno Silva, Pedro Sousaand Miguel Mira da Silva (2019). *New Perspectives on Information Systems Modeling and Design (pp. 1-19).*
www.irma-international.org/chapter/evolution-of-archimate-and-archimate-models/216329

Data Warehouse Refreshment
Alkis Simitsis, Panos Vassiliadis, Spiros Skiadopoulosand Timos Sellis (2008). *Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications (pp. 3049-3066).*
www.irma-international.org/chapter/data-warehouse-refreshment/7821

A Data Mining Driven Approach for Web Classification and Filtering Based on Multimodal Content Analysis
Mohamed Hammami, Youssef Chahirand Liming Chen (2008). *Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications (pp. 1958-1986).*
www.irma-international.org/chapter/data-mining-driven-approach-web/7743

Pattern Synthesis for Large-Scale Pattern Recognition
P. Viswanath, M. Narasimha Murtyand Shalabh Bhatnagar (2005). *Encyclopedia of Data Warehousing and Mining (pp. 902-905).*
www.irma-international.org/chapter/pattern-synthesis-large-scale-pattern/10724