Institute of Science & Technology for Advanced Studies & Research (ISTAR)
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M.Sc. (Information Technology)
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Research Paper Topic on:

RESEARCH ON DATA SCIENCE, DATA ANALYTICS AND BIG DATA

Present By:
Yuvraj Champaneri 22301410301007
Bhavin Patel 22301410301001
M.sc.IT (Semester 2)

Reviewed By:
Dr. Niky Jain
ASST.PROFESSOR
(ISTAR)

Author

Rahul Reddy Nadikattu

University of the Cumberlands, United States

Abstract

This research paper explores the concepts of Data Science, Data Analytics, and Big Data, elucidating their significance and impact across various sectors such as retail, banking, healthcare, and telecommunications. It discusses the role of professionals in these fields, the skills required, and the evolving landscape of analytics. The paper also examines the progression of analytics from descriptive to prescriptive analytics, culminating in the era of Automated Analytics. Furthermore, it highlights the potential of artificial intelligence and machine learning in shaping the future of analytics and decision-making processes.

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- Introduction Big Data
- Introduction Data Science
- Introduction Data Analytics
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- Evolution of Analytics
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key points

1.Introduction to Big Data: Big data is described as a vast volume of structured, semi-structured, and unstructured data generated through digital channels like mobile, internet, social media, etc. Its significance has grown exponentially over the years, impacting sectors such as retail, banking, fraud detection, customer-centric applications, and operational analysis.

2.Data Science: Data science involves extracting insights from large datasets using technology, mathematics, and statistical techniques. It's highlighted as a field with lucrative career opportunities, with impacts on sectors like web development, digital advertisements, e-commerce, finance, telecom, and utilities.

3.Data Analytics: Data analytics focuses on providing operational insights into complex business situations. It emphasizes the importance of speed and efficiency in uncovering insights for immediate decisions. Data analytics impacts sectors like transportation, financial analysis, retail, research, energy management, and healthcare.

4.Interconnection and Differences: The article explains the interconnection and differences between data science and big data analytics. While data science focuses on asking questions and establishing potential trends, big data analytics emphasizes discovering answers to specific questions being asked.

5.Industry Applications: The article discusses how big data and analytics are applied in different sectors such as financial services, communications, retail, healthcare, travel, gaming, and energy management.

6.Evolution of Analytics: The article traces the evolution of analytics from descriptive and diagnostic analytics to predictive and prescriptive analytics. It discusses how automation through intelligent systems has led to the emergence of Analytics 4.0, emphasizing the role of artificial intelligence, machine learning, and deep learning.

7.Future Prospects: The article describes the types of jobs and skills required or available for data science, big data, and data analytics. "Data Scientist is one of the most trending profiles in the 21st century."

Big Data

Big Data refers to a huge volume of data of various types, i.e., structured, semi structured, and unstructured. This data is generated through various digital channels such as mobile, Internet, social media, e-commerce websites, etc. Big Data has proven to be of great use since its inception, as companies started realizing its importance for various business purposes. Now that the companies have started deciphering this data, they have witnessed exponential growth over the years.

Impact on various sectors

- **Retail**
- **Banking and investment**
- **Fraud detection and analysis**
- **Customer-centric applications**
- **Operational analysis**

Data Science

Data Science deals with the slicing and dicing of the big chunks of data, as well as finding insightful patterns and trends from them using technology, mathematics, and statistical techniques. Data Scientists are responsible for uncovering the facts hidden in the complex web of unstructured data so as to be used in making business decisions. Data Scientists perform the aforementioned job by developing heuristic algorithms and models that can be used in the future for significant purposes. This amalgamation of technology and concepts makes Data Science a potential field for lucrative career opportunities. McKinsey once predicted that there will be an acute shortage of Data Science Professionals in the next decade.

Impact on various sectors

- **Web development**
- **Digital advertisements**
- **E-commerce**
- **Finance**
- **Telecom**
- **Utilities**

Data Analytics

Data Analytics uncovers operational insights for businesses by leveraging data, a concept existing since the 1950s. The emergence of big data analytics has revolutionized the process, emphasizing speed and efficiency. Instead of manual examination, modern analytics enable immediate decision-making, fostering agility and a competitive edge. Data Analysts delve into historical data, tackling challenging scenarios and applying methodologies for optimal solutions. They also forecast upcoming opportunities, aiding business growth. The global growth of Data Analytics is evident, with a projected 50% increase in Big Data market revenue.

Impact on various sectors

- **Traveling and transportation**
- **Financial analysis**
- **Retail**
- **Research**
- **Energy management**
- **Healthcare**

Interconnection and Differences

Data Science vs. Data Analytics

Data science focuses on uncovering potential trends and questions from large datasets, while data analytics provides actionable insights based on specific queries

Data Science vs. Big Data Analytics

While data science focuses on asking questions and establishing trends, big data analytics emphasizes discovering answers to existing questions.

Data Analytics vs. Big Data Analytics

Data analytics focuses on analyzing datasets to uncover insights using traditional techniques, while big data analytics deals with massive and complex datasets, employing advanced methods and specialized tools to extract valuable insights.

DATA SCIENCE AND BIG DATA

They are not the “same thing”

Big data is about extracting “crude oil”, transporting it in “mega tankers”, siphoning it through “pipelines”, and storing it in “massive silos” Data science is about refining the “crude oil”

Industry Applications

1.Financial Services:	Utilized for customer analytics, compliance analytics, and fraud analytics.
2.Communications:	Used to gain new subscribers, retain customers, and analyze customer-generated and machine-generated data.
3.Retail:	Crucial for understanding customer behavior and preferences through various data sources.
4.Healthcare:	Employed for optimizing patient flow, treatment, and equipment usage to improve quality of care.

Industry Applications

5.Travel:	Enhances buying experiences and offers personalized recommendations through data analysis.
6.Gaming:	Collects data to optimize spending and enhance user experience within and across games
7.Energy Management:	Utilized for smart grid management, energy optimization, and monitoring network performance in utility companies.

Evolution of Analytics

Analytics 1.0

Descriptive and diagnostic analytics focused on past data, limited predictions.

Analytics 2.0

Introduction of big data, emergence of roles like Big-Data Engineers & Hadoop Administrators.

Analytics 3.0

Emphasis on predictive and prescriptive analytics, leveraging machine learning for better decision-making.

Analytics 4.0

Integration of artificial intelligence, machine learning, and deep learning for automated analytics and advanced insights

JOBS

- **Big Data** is helping the retail, banking, and other industries by providing some of the important technologies such as fraud-detection systems, operational analysis systems, etc.
- **Data Analytics** allows the industries of healthcare, banking, traveling and transport, energy management, etc.
- **Data Science** is letting the companies get into web development, digital advertisements, e-commerce, etc.

Data Scientist is one of the most trending profiles in the 21st century.
There is considerable overlapping of roles between Data Analysts and Big Data Professionals. **Data Science is booming like anything and hence has been tagged as the sexiest job of the 21st century by Forbes**.

Skill

Therefore, you should clearly know what you want to become and what skills you need to have for that. In order to become a **Data Scientist, you need to be proficient in mathematics, statistics, programming, and business strategies. You should have good communication skills, as a Data Scientist needs to distribute the information to various departments of an organization.** Similarly, a **Big Data Professional would require having a good grasp of technology (such as Hadoop and Java), mathematics, and statistics**, as well as analytics. However, a **Data Analyst needs to be good in programming, Artificial Intelligence, and data wrangling**

Thank you