THE ROLE OF BIG DATA

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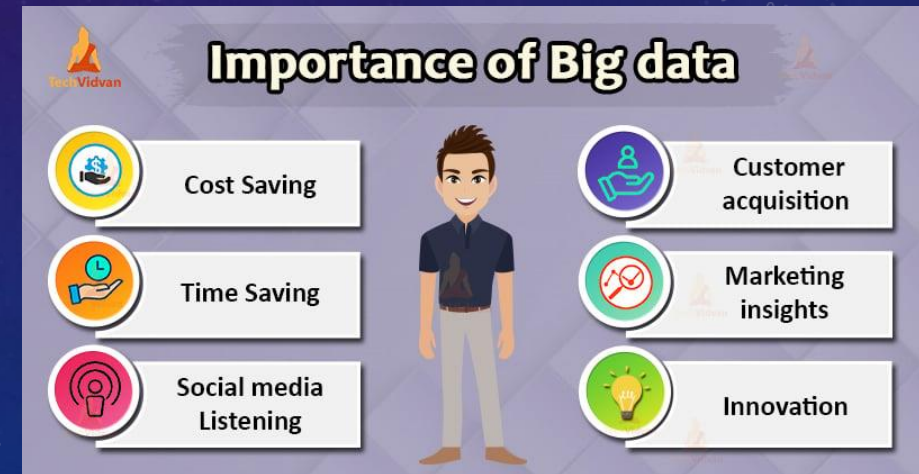# TRANSFORMING INSIGHTS INTO ACTION

The role of big data, briefly:
Big data plays a critical role in helping organizations and individuals make informed decisions by analyzing large, complex datasets. It enables:

1.**Better Decision-Making** – By uncovering patterns, trends, and insights from vast data sources.

2.**Improved Efficiency** – Through automation and optimization in operations.

3.**Enhanced Customer Experiences** – Via personalized services and targeted marketing.

4.**Innovation** – Supporting the development of new products, services, and business models.

In short, big data drives smarter, faster, and more accurate outcomes across nearly every industry.

IMPORTANTS OF ROLE OF BIG DATA

1. Informed Decision-Making:Big data provides insights that help businesses and governments make smarter, evidence-based decisions.2. Competitive Advantage:Organizations that leverage big data can outperform competitors by identifying market trends and customer preferences faster.3. Cost Reduction:Big data tools (like Hadoop and Spark) can process massive data volumes efficiently, helping reduce storage and operational costs.4. Innovation and Product Development:Companies use big data to identify gaps in the market, improve existing products, and develop new solutions.5. Enhanced Customer Experience:By analyzing customer behavior, businesses can offer personalized services and improve satisfaction.6. Real-Time Monitoring:Industries like healthcare, finance, and transportation use big data for real-time risk detection, fraud prevention, and system optimization.7. Improved Operational Efficiency:Big data analytics helps streamline supply chains, optimize logistics, and enhance productivity.In essence, big data is vital for growth, efficiency, and strategic planning in today's data-driven world.

Importance of Big data

Cost Saving

Time Saving

Social media Listening

Customer acquisition

Marketing insights

Innovation

KEY FEATURES OF BIG DATA

- Volume

- Refers to the massive amount of data generated every second from various sources like social media, sensors, transactions, and devices

VelocityDescribes the speed at which data is generated, processed, and analyzed — often in real-time or near-real-time.

VarietyIndicates the different types of data: structured (databases), semi-structured (XML, JSON), and unstructured (videos, images, text).

The most important aspect — extracting meaningful insights and business value from the data.

INTRODUCTION TO BIG DATA

- Big Data refers to extremely large and complex sets of data that traditional data processing tools cannot efficiently handle, store, or analyze. This data comes from a wide range of sources such as social media, sensors, mobile devices, transactions, and more — often in real-time and at high speed.

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- With the rapid growth of the digital world, data is being generated in massive volumes every second. Big data technologies and analytics help organizations capture, store, process, and extract valuable insights from this data to improve decision-making, customer experience, and business outcomes.

TYPES OF BIG DATA

- Structured Data

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- Definition: Data that is organized in a predefined format, typically in rows and columns (like in relational databases).

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- Examples:

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- Customer information in a CRM system

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- Bank transactions

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- Excel spreadsheets

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- Storage: Relational databases (e.g., MySQL, Oracle)

USES OF BIG DATA

- Big data is used across many sectors to drive smarter decisions, improve efficiency, and uncover hidden patterns. Here are some of its most common and impactful uses:

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- 1. Business and Marketing

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- Customer behavior analysis

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- Personalized marketing and recommendations (e.g., Amazon, Netflix)

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- Sales forecasting and trend analysis

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- Improving customer service through chatbots and feedback analysis

APPLICATION OF BIG DATA

- Big data has a wide range of applications across various industries, revolutionizing how organizations operate and make decisions. In healthcare, it is used to analyze patient records, predict disease outbreaks, and provide personalized treatment plans. In finance, big data helps detect fraud, assess credit risk, and guide investment strategies through real-time market analysis. Retail and e-commerce companies use it to understand customer behavior, offer personalized recommendations, and optimize inventory and supply chains. Educational institutions apply big data to monitor student performance and create customized learning paths. Governments use it for smart city development, traffic management, and public safety initiatives. Meanwhile, manufacturing sectors rely on big data for predictive maintenance, quality control, and improving production efficiency. Even in agriculture, big data is transforming farming practices through weather forecasting, crop monitoring, and yield prediction. These applications show how big data drives innovation, enhances efficiency, and supports better decision-making across almost every field.

Top Big Data Applications

Education, E-commerce, Government, Airline, Healthcare, Fast-Food, Weather Patterns, Agriculture, Banking, BIG DATA, TechVidvan

STRUCTURE OF BIG DATA

The structure of big data refers to the way data is organized, stored, and processed. Big data is generally categorized into three types based on its structure: structured, semi-structured, and unstructured data. Structured data is highly organized and stored in tabular formats, such as rows and columns in relational databases, making it easy to search and analyze. Examples include financial transactions, employee records, and customer databases. Semi-structured data does not follow a strict tabular format but still contains tags or markers to separate data elements. Common examples are XML files, JSON data, and email logs. Finally, unstructured data lacks a defined structure and includes a wide variety of content such as images, videos, social media posts, and audio recordings. It is the most complex type to manage and analyze but often holds valuable insights. Understanding the structure of big data is crucial, as it determines the tools and techniques required for effective storage, processing, and analysis.
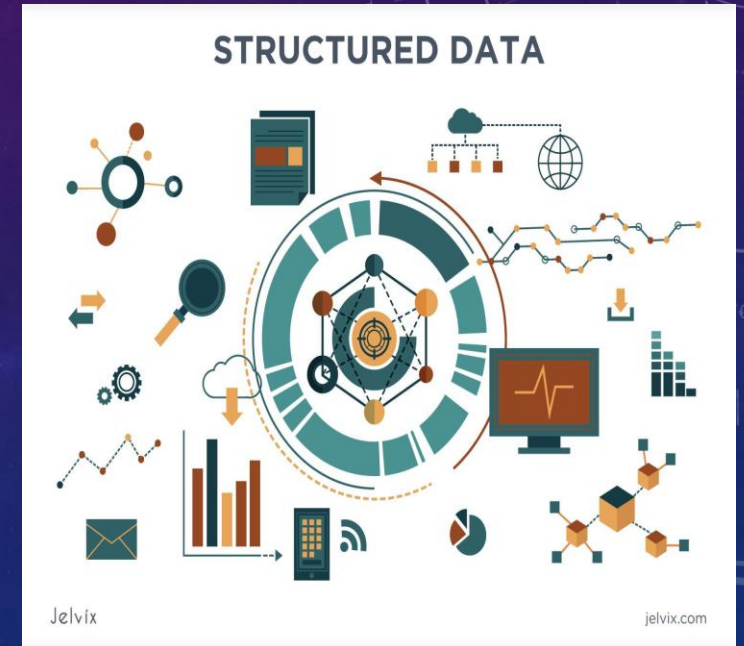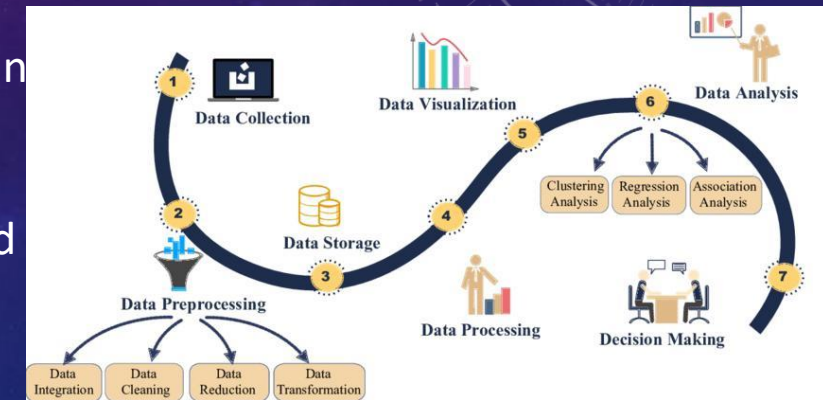
BIG DATA TOOLS

- Big data tools are essential for collecting, processing, storing, and analyzing vast volumes of data efficiently. These tools help organizations extract meaningful insights from complex datasets. One of the most popular tools is Hadoop, an open-source framework that allows distributed storage and processing of large data sets across clusters of computers. Another widely used tool is Apache Spark, known for its high-speed data processing and support for real-time analytics. NoSQL databases like MongoDB, Cassandra, and Hbase are designed to handle semi-structured and unstructured data that traditional relational databases cannot manage effectively

BIG DATA PROCESSING :

Big data processing refers to the methods and technologies used to analyze, manage, and extract valuable insights from extremely large and complex data sets that traditional data-processing software cannot handle efficiently. It involves collecting data from various sources, storing it in scalable systems, and processing it using frameworks like Hadoop, Spark, or Flink. These tools enable parallel processing, real-time analytics, and machine learning applications. Big data processing is essential for industries such as healthcare, finance, marketing, and logistics, where understanding patterns, trends, and user behavior can lead to smarter decision-making and competitive advantages.

Layer	Tools
Data Ingestion	Kafka, Flume, NiFi
Storage	HDFS, Amazon S3, Cassandra, HBase
Processing	Hadoop, Spark, Flink, Storm
Querying	Hive, Impala, Pre

BIG DATA EXAMPLE :

- A popular example of big data is Netflix. The platform collects and analyzes massive amounts of data from over 200 million users worldwide. This includes viewing habits, search history, watch time, device usage, and user ratings. Using big data analytics, Netflix can recommend personalized content, predict what shows will be successful, and even decide what original content to produce. This data-driven approach helps improve user experience and optimize business decisions.
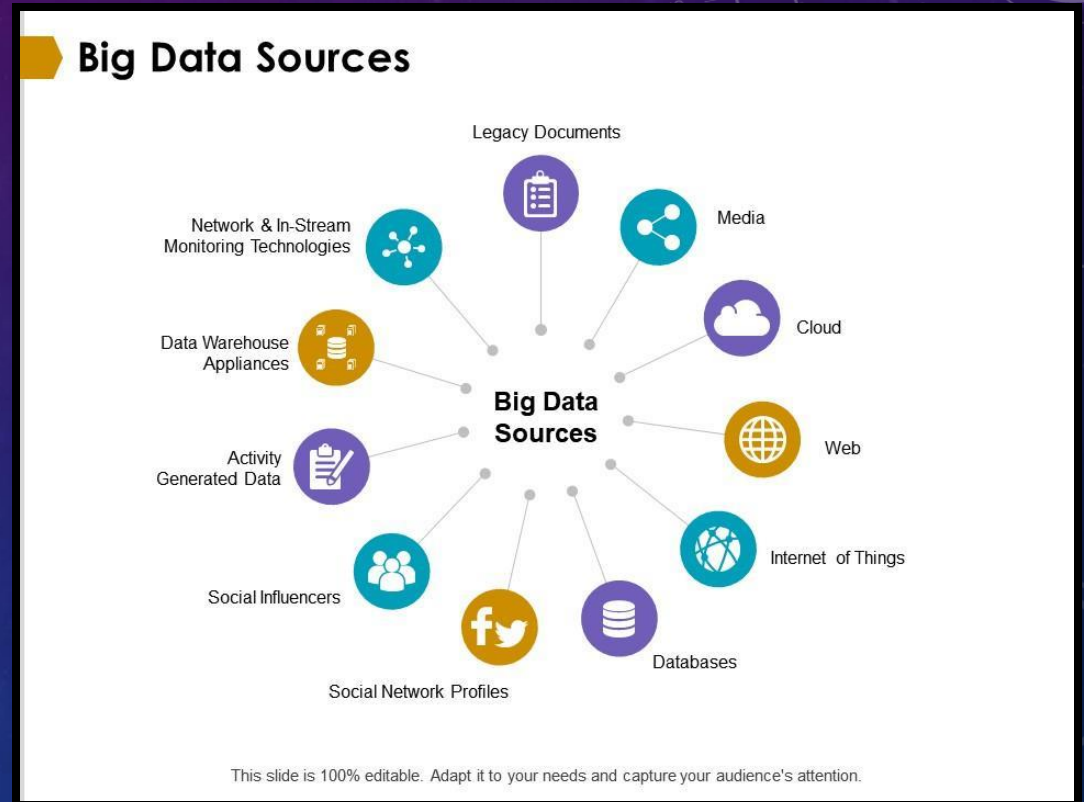

Big Data Examples

Healthcare 01   07 Entertainment

Finance 02   **Examples of Big Data**   06 Agriculture

Retail 03   05 Education

04

Inventory Management

DATAFICATION:

❖ DATAFICATION

- Datafication refers to put data in a quantified format so it can be tabulated and analyzed.

- Digitization of all data in its various formats and collecting them in structured formats helps us in Big Data analysis.

- Analyzing these data gives us useful insights into the behavioral shifts of customers. Videos and photographs when digitized can help us to gain insights into the behavior patterns of the users.

- Google Translation service digitized 95 Billions of lines available from every possible book it could access and created a robust and freely accessible database for searching.
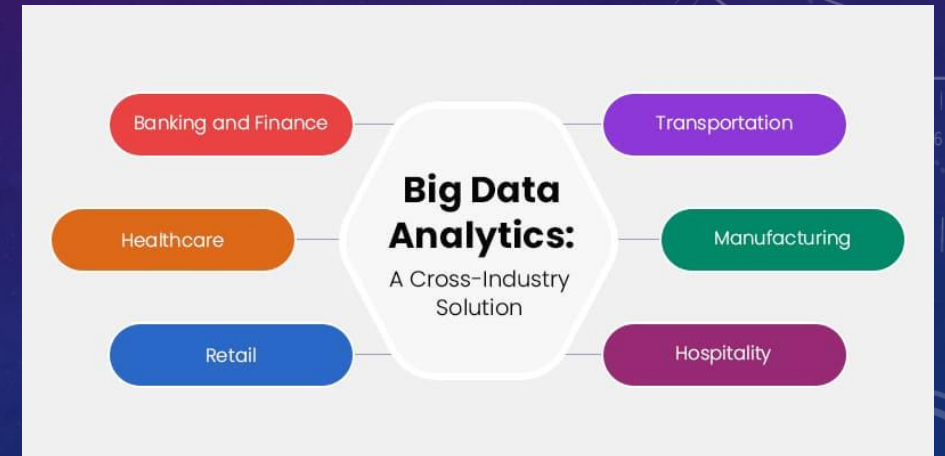
BIG DATA SOURCES

- Sources of Big Data can come from a wide range of digital and physical environments, generating massive volumes of information every second. Common sources include social media platforms (like Facebook, Twitter, and Instagram), where users generate data through posts, likes, and shares; sensor data from Internet of Things (IoT) devices such as smart thermostats, fitness trackers, and industrial machines; transactional data from online purchases, banking systems, and retail operations; and log data from websites and mobile apps. Additionally, healthcare records, satellite imagery, video surveillance, and government databases also contribute to big data. These diverse sources feed into systems designed to store, process, and analyze data at high speed and large scale, enabling organizations to gain insights and make informed decisions.

Big Data Sources

- Legacy Documents
- Media
- Cloud
- Web
- Internet of Things
- Databases
- Social Network Profiles
- Social Influencers
- Activity Generated Data
- Data Warehouse Appliances
- Network & In-Stream Monitoring Technologies

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BIG DATA ANALYTICS:

- Big data analytics is the process of examining large and complex data sets to uncover hidden patterns, correlations, trends, and insights that can drive better decision-making. Using advanced tools and techniques such as machine learning, artificial intelligence, data mining, and statistical analysis, organizations can analyze both structured and unstructured data in real time or batch mode. Big data analytics helps businesses optimize operations, personalize customer experiences, detect fraud, forecast trends, and improve product development. Industries like healthcare, finance, retail, and transportation heavily rely on big data analytics to stay competitive and innovative in a rapidly evolving digital world.

THANK YOU