

Leveraging Big Data in Life Sciences

A SCALABLE AI WHITE PAPER

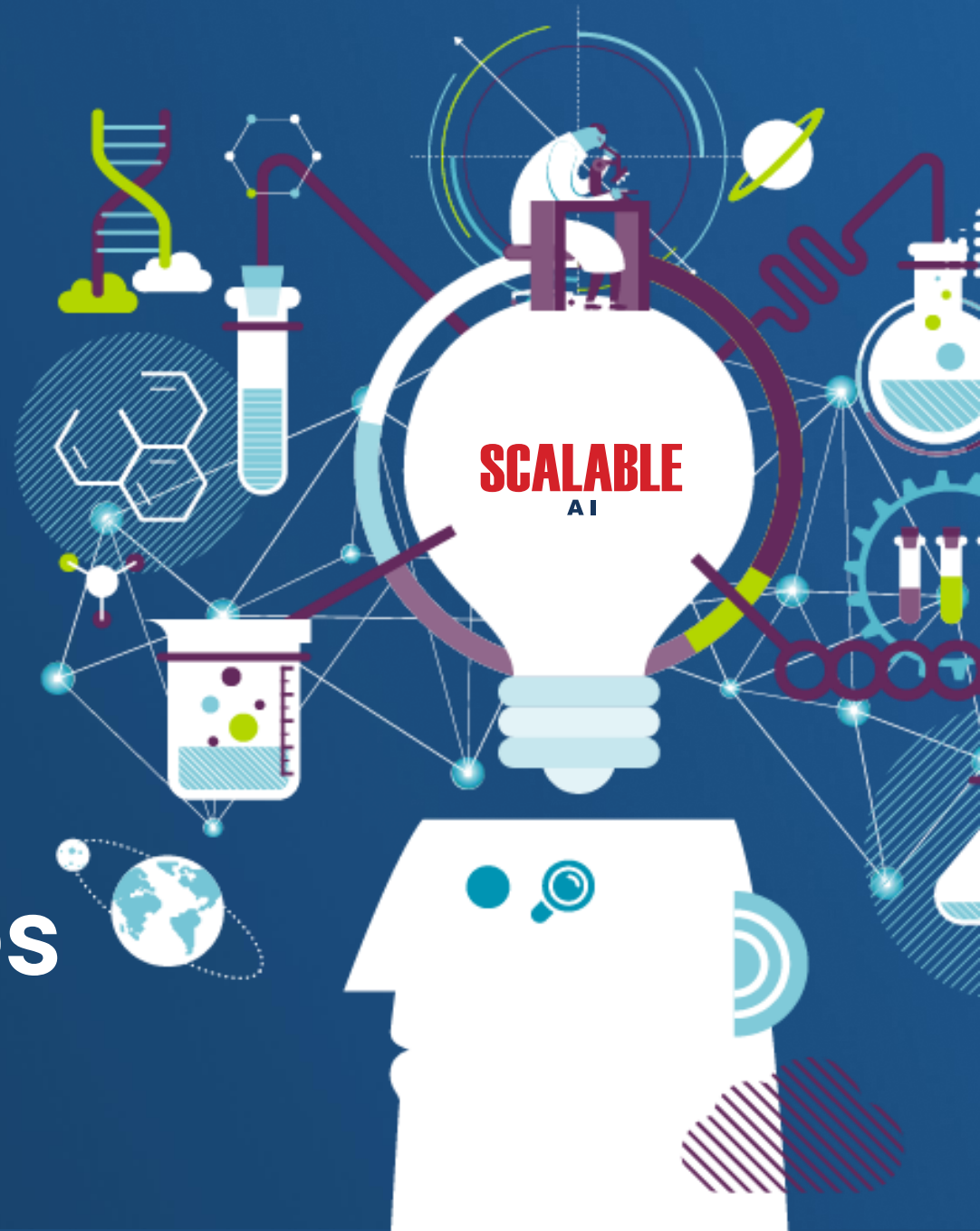


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EXECUTIVE SUMMARY

Big data is transforming drug discovery and development by enabling researchers to analyze large datasets, identify potential drug candidates, and predict clinical trial outcomes more accurately. This accelerates the development process and reduces costs, ultimately bringing new treatments to market faster. Personalized medicine is another area where big data is making a profound difference. By analyzing individual genetic, environmental, and lifestyle factors, healthcare providers can tailor treatments to each patient, improving efficacy and reducing adverse effects.

In genomics and proteomics, advancements in sequencing technologies have generated vast amounts of data, leading to breakthroughs in understanding diseases at a molecular level. This wealth of information is paving the way for new therapeutic approaches and precision medicine. Additionally, big data enhances patient care and outcomes by integrating real-time data from electronic health records, wearable devices, and other sources. This comprehensive view of patient health allows for more accurate diagnoses, better monitoring, and timely interventions.

Despite its many advantages, leveraging big data in life sciences comes with challenges, including data privacy and security concerns, the need for robust data management systems, and the complexity of integrating diverse data sources. Addressing these challenges is crucial to fully realize the potential of big data. Looking ahead, the continued evolution of big data technologies promises to drive further innovations, improve patient outcomes, and transform the life sciences industry.

This whitepaper provides an in-depth analysis of the current state and future prospects of big data in life sciences, offering valuable insights for industry stakeholders. By understanding the transformative power of big data, life sciences organizations can harness its potential to drive innovation, improve patient care, and stay ahead in a competitive landscape.

UNDERSTANDING BIG DATA

As patients continue to become more knowledgeable about and personally involved in making healthcare choices, and with direct-to-consumer marketing becoming so important, it is imperative to utilize Big Data analytics. However, since conventional BI database tools are insufficient for handling, analyzing and reporting on these increasingly valuable data sets, many companies now have significant blind zones with respect to their global presence. The ability to successfully manage the tsunami of daily data, ranging from website referrals, customer transactions, patient records, mobile devices and social media, demands the use of advanced, cost-effective cloud solutions and new business tools.

For many companies, their volume of raw data is increasing at more than 50% per year.

With unstructured data growing ever more massive, the danger of “garbage in–garbage out” has also been amplified. In addition to the staggering Volume, Variety and timesensitive Velocity intrinsic to Big Data, there is also the issue of Veracity – the need to be sure of the validity of the data. Successfully addressing such Four V challenges, and profiting from the dynamics of a hyper-connected world, requires leading-edge expertise in rapidly capturing, cleaning and effectively presenting analyses of huge mines of natural language data.



Big Data utilizes server clusters, processing engines such as Hadoop, and new interactivity tools to store, mine and analyze virtually unlimited amounts of highly complex statistical data. To maximize the information's value, these complex data sets must then be presented in effective real-time dashboard visualizations. Without the creative insights of a data scientist, though, such visualizations will often not provide the level of value and intelligence desired. A data scientist must possess math and programming skills plus scientific insights to evaluate huge numbers of factors, ask the right questions, and then produce meaningful visualizations.

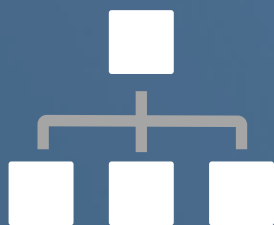
The potential benefits from Big Data are enormous. Unlike traditional sources of costly consumer intelligence, such as from surveys, focus groups and corporate research, social data is instantly available. Voluntarily given by your customer base, it also has the advantage of providing key demographic and psychographic data for free. Not only can it help you track and optimize traditional and social media campaigns, but sentiment analysis unveils your customers' emotions and preferences, providing instantly actionable information about your products and brands.

“ Data are becoming the new raw material of business

-- Craig Mundie, Head of research and strategy, Microsoft

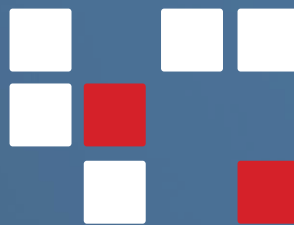


TYPES OF BIG DATA FOR PHARMA



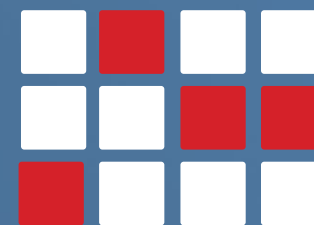
Structured Data

Structured data refers to quantitative data that is organized in a fixed format, making it easy to process, store, and retrieve. In the healthcare sector, structured data includes demographic details, vital indicators (such as height, weight, blood pressure, and blood glucose levels), billing codes, prescriptions, and laboratory test results. This type of data is highly organized, allowing for efficient management and easy retrieval from databases.



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Semi-Structured Data

Semi-structured data is a blend of structured and unstructured data, characterized by a loose organization into categories using meta tags. This type of data is easier to analyze compared to unstructured data. Examples in healthcare include data stored in JSON and XML formats, as well as tweets organized by hashtags. Semi-structured data bridges the gap between the rigidity of structured data and the complexity of unstructured data, enabling more flexible analysis.

BIG DATA ANALYTICS IN HEALTHCARE

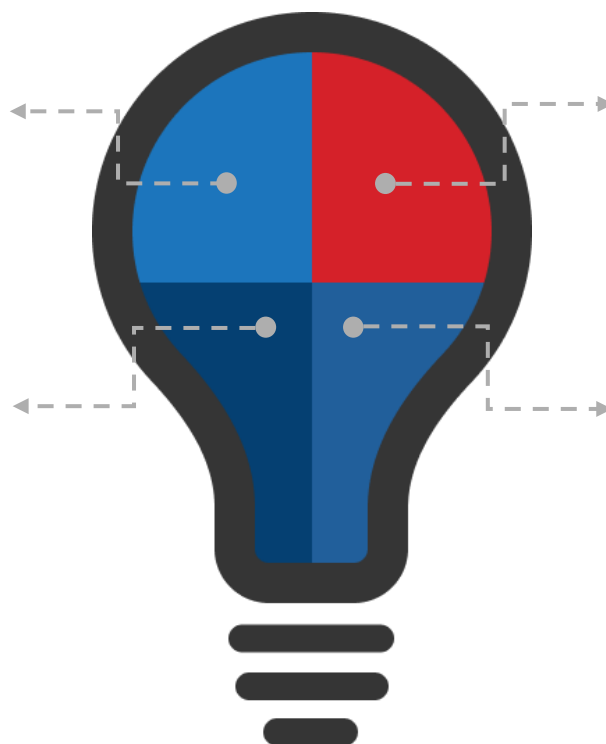
Big data analytics is pivotal in the healthcare sector, aiding organizations in analyzing vast amounts of data to uncover trends and patterns. This analysis is crucial for improving patient outcomes and optimizing resource allocation. There are four primary types of big data analytics in the healthcare industry:

Descriptive Analytics

Descriptive analytics involves examining historical data and past events to generate insights. Big data technologies and tools enable users to mine and recover data that helps dissect issues and prevent them from reoccurring.

Prescriptive Analytics

Prescriptive analytics is an advanced technique that involves creating intricate models by integrating multiple data sources and utilizing machine learning. This type of analytics aims to recommend optimal actions and decisions, helping healthcare organizations make data-driven choices for improved outcomes.



Predictive Analytics

Predictive analytics uses data to forecast future outcomes based on historical trends and patterns. By employing advanced statistical techniques and machine learning algorithms, healthcare providers can predict the likelihood of specific events or conditions, allowing for proactive intervention and better patient management.

Diagnostic Analytics

Diagnostic analytics builds on descriptive analytics by using data to identify correlations between variables and understand the reasons behind observed patterns and trends. This provides valuable insights for healthcare organizations to improve their operations and patient care.



APPLICATION OF BIG DATA IN HEALTHCARE

The exponential growth of data in the healthcare domain has led to increased adoption of big data analytics tools and technologies. These tools transform challenges into opportunities, enabling personalized patient care and efficient operations across various healthcare verticals:



- **Population Health Management**

Data analytics plays a vital role in population health management by gathering demographic and clinical data from various sources. Healthcare providers can identify populations in need of care, measure the care provided, and deliver targeted interventions, improving community health outcomes.



- **Electronic Health Record (EHR) Management**

Predictive analytics within EHR management allows healthcare providers to identify patterns and trends in patient data. This technology enables early detection of diseases or conditions, leading to timely interventions and improved health outcomes for patients.



- **Hospital Management**

Hospitals generate vast amounts of data from various sources, including patient medical records and examination results. By analyzing this data, healthcare organizations can identify patterns, predict patient outcomes, and develop personalized treatment plans, ultimately enhancing patient care and reducing costs.



- **Pharmaceutical Research**

Big data analytics is applied in drug discovery, precision medicine, clinical trial optimization, pharmacovigilance, and supply chain management. By analyzing large datasets from clinical trials, genetic data, and EHRs, big data analytics helps identify potential drug candidates, accelerates drug discovery, and leads to the development of targeted medicines.



- **Telemedicine and Telehealth**

Remote patient monitoring through telemedicine allows healthcare providers to access real-time patient data, enabling early detection and timely intervention. Analyzing large volumes of patient data, including EHRs and medical imaging, helps identify patterns and trends, resulting in accurate diagnoses, personalized treatment plans, and improved patient outcomes.



- **Supply Chain Management**

Integrating big data analytics in healthcare supply chain management optimizes operations by providing insights into staffing schedules, inventory management, and demand forecasting. This leads to more informed decision-making and efficient resource allocation.



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ENABLING YOUR REPS

Customer Relationship Management (CRM) analytics has become indispensable for enhancing the quality of pharma sales calls, fostering team collaboration, understanding customer and market dynamics, and boosting sales force effectiveness. For pharmaceutical sales reps to maximize their potential, they must have seamless access to CRM and information systems, allowing them to read and write data directly. Furthermore, mobile dashboards need to be customized to display only the relevant information that sales reps require to perform their duties efficiently.

Big Data analytics is a powerful tool for deciphering relationships and trends within vast data sets. These sets include transaction records, prescription orders, customer feedback, and clinical data, all contributing to a comprehensive understanding of the pharmaceutical landscape. Leveraging mobile devices, social media, cloud services, and Big Data analytics, pharmaceutical enterprises can significantly empower their operations.



Modernizing applications and their maintenance using advanced social business intelligence tools and technologies can also lead to substantial cost reductions. This modernization not only streamlines processes but also enhances ROI, facilitates better communication, and significantly improves access to critical information. These advancements offer life sciences enterprises and their sales reps numerous benefits, driving greater efficiency and effectiveness in their operations.

Today's pharmaceutical industry is rapidly evolving, and the integration of cutting-edge technologies and analytics is crucial for staying competitive. Embracing these tools and strategies ensures that sales reps are equipped with the necessary resources to excel, ultimately leading to increased sales and improved customer satisfaction.

About Scalable AI

We deliver actionable insights and predictive analytics that organizations can use to identify opportunities, manage risks, achieve operational excellence, and to gain an innovative edge.

www.scalableai.com

About Scalable Systems

Scalable Systems is a Data, Analytics & Digital Transformation Company focused on vertical specific innovative solutions. By providing next generation technology solutions & services, we help organizations to identify risks & opportunities, achieve sales & operational excellence to gain an innovative edge.

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