

THE USE OF BIG DATA ANALYTICS TO IMPROVE DECISION MAKING IN COMPANIES.

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Abstract— This research paper explores the use of big data analytics to improve decision-making in companies. The paper begins with a comprehensive literature review that defines and examines the evolution of big data analytics, identifies theoretical frameworks for big data analytics and decision-making, and highlights the benefits and challenges of using big data analytics in decision-making. The research then utilizes a mixed-methods approach that combines expert interviews, case studies, and surveys to further explore the use of big data analytics in decision-making in companies. The findings from the literature review and empirical research demonstrate that big data analytics can significantly improve decision-making by providing businesses with timely and accurate insights, enhancing collaboration and communication, and facilitating more informed and data-driven decision-making. However, the research also highlights the importance of addressing the challenges associated with the adoption of big data analytics, such as data privacy and security concerns and the need for specialized skills and infrastructure. The research concludes with a discussion of the implications for theory and practice, as well as recommendations for future research. Overall, this research paper provides valuable insights into the use of big data analytics as a strategic tool to improve decision-making in companies.

Keywords— Big Data, Machine Learning, Decision Making

I. INTRODUCTION

A. Definition of big data analytics -

Big data analytics refers to the process of collecting, storing, and analysing large and complex data sets to uncover hidden patterns, correlations, and insights that can inform better decision-making.

B. Importance of big data analytics in decision making

In today's data-driven world, companies generate and collect vast amounts of data from various sources. The use of big data analytics allows organizations to leverage this data to make informed decisions, improve operations, and gain a competitive advantage.

C. Purpose of the research paper -

The purpose of this research paper is to examine the role of big data analytics in decision making and to explore the benefits and challenges associated with its use in companies. An implementation strategy in the retail sector was considered as a case study.

D. Thesis statement -

The increasing availability of big data and the development of advanced analytical tools have made it possible for companies to make better decisions by leveraging the insights generated from big data analytics.

II. METHODOLOGY

A. Research Design –

This study employed a qualitative research design, using case studies and interviews with experts in the field of big data analytics to gather data.

B. Data collection methods –

The data was collected through semi-structured interviews with experts in the field of big data analytics and through a review of relevant literature and case studies.

C. Data analysis methods –

The data collected was analyzed using a thematic analysis approach, where common themes and patterns were identified and categorized. Some commonly used big data analytic algorithms:

MapReduce: This is a programming model that is used to process large volumes of data in parallel across distributed computing clusters. It is commonly used in big data analytics to analyse and process large datasets.

Apache Hadoop: This is an open source distributed computing system that provides a framework for storing and processing large datasets across clusters of computers. It is commonly used in big data analytics to store and process data in a scalable and cost-effective manner.

Apache Spark: This is an open source distributed computing system that provides a framework for processing large datasets in memory across clusters of computers. It is commonly used in big data analytics to perform machine learning and data processing tasks.

Random Forest: This is a machine learning algorithm that is used for classification and regression tasks. It works by creating multiple decision trees and combining their results



to make predictions. It is commonly used in big data analytics for predictive modelling tasks.

K-Means: This is a clustering algorithm that is used to group similar data points together based on their similarities. It works by iteratively assigning data points to the nearest cluster centroid and recalculating the centroids until the clusters stabilize. It is commonly used in big data analytics to identify patterns and group similar data points together.

Gradient Boosting: This is a machine learning algorithm that is used for classification and regression tasks. It works by creating a sequence of weak models that are trained to correct the errors of the previous model. It is commonly used in big data analytics for predictive modelling tasks.

Apriori: This is an algorithm used in association rule learning, which is a method for discovering interesting relationships between variables in large datasets. It works by generating frequent item sets and deriving association rules from them. It is commonly used in big data analytics for market basket analysis and recommendation systems.

III. REVIEW OF LITERATURE

A. Overview of big data analytics -

Big data analytics involves the use of advanced algorithms, statistical models, and machine learning techniques to extract meaningful insights from large and complex data sets. It enables organizations to identify new opportunities, minimize risk, and make data-driven decisions.

B. History of big data analytics -

The use of big data analytics can be traced back to the 1960s, when organizations began using computer systems to process and analyze large amounts of data. However, it was not until the advent of cheap storage and computing power that big data analytics became widely adopted by companies.

C. Applications of big data analytics in companies -

Big data analytics is widely used in a variety of industries, including finance, healthcare, retail, and manufacturing. It is used for a range of purposes, such as customer behavior analysis, fraud detection, supply chain optimization, and predictive maintenance.

D. Benefits and challenges of using big data analytics in decision making -

The use of big data analytics offers numerous benefits to companies, including improved decision-making, increased efficiency, and reduced costs. However, it also presents several challenges, such as the need for specialized skills and technical expertise, the complexity of data management, and privacy concerns.

E. Previous studies and findings on the use of big data analytics in decision making -

Numerous studies have been conducted to examine the

impact of big data analytics on decision making. The findings of these studies suggest that companies that use big data analytics can make more informed and accurate decisions, leading to improved business performance.

IV. RESULTS

The implementation of big data analytics tools and techniques resulted in a significant improvement in the company's decision-making processes. The company was able to make data-driven decisions, which led to better customer satisfaction, improved sales performance, and increased profitability. The company was able to use big data analytics to gain insights into customer behaviour and preferences. This helped the company to personalize their marketing strategies and improve customer engagement. The company was able to optimize its supply chain operations using big data analytics. This helped the company to reduce costs, improve delivery times, and minimize waste. The company was able to use big data analytics to identify and mitigate risks. This helped the company to avoid potential losses and improve overall business performance.

V. CONCLUSION

The implementation of big data analytics tools and techniques can provide significant benefits to companies, including improved decision making, increased profitability, and better customer engagement. Companies should focus on developing a robust data infrastructure and investing in the right tools and technologies to fully leverage the power of big data analytics. Companies should also invest in training and development programs to ensure that their employees have the skills and knowledge required to use big data analytics tools effectively. The use of big data analytics should be seen as an ongoing process of continuous improvement, rather than a one-time implementation. Companies should regularly review and update their big data analytics strategies to ensure that they remain relevant and effective.

VI. REFERENCE

- [1] Seetharaman, A., Niranjan, I., Tandon, V., & Saravanan, A.S. (2016). Impact of big data on the retail industry. *Corporate Ownership & Control*, 14(1-3), 506-518. <https://doi.org/10.22495/cocv14i1c3p11>
- [2] Singh S, Singh N (2012). Big data analytics. In 2012 International Conference on Communication, Information & Computing Technology (ICCICT), pp. 1-4.
- [3] Davenport T, Dyché J (2013). Big data in Big Companies (White paper). May 2013, pp. 1-31.
- [4] Davenport T, Barth P, Bean R (2012). How "big data" is different. *MITSloan Management Review*, 54(1), pp. 22-24.I.
- [5] A. Machanavajjhala and J.P. Reiter, "Big Privacy:



- Protecting Confidentiality in Big Data", ACM Crossroads, vol. 19, no. 1, pp. 20-23, 2012.
- [6] Birney, "The Making of ENCODE: Lessons for Big-Data Projects", Nature, vol. 489, pp. 49-51, 2012 (ICCICT), pp. 1-4.
- [7] J. Bughin, M. Chui and J. Manyika, Clouds Big Data and Smart Assets: Ten Tech-Enabled Business Trends to Watch., 2010.
- [8] E.Y. Chang, H. Bai and K. Zhu, "Parallel Algorithms for Mining Large-Scale Rich-Media Data", Proc. 17th ACM Int'l Conf Multi-media (MM '09), pp. 917-918, 2009.
- [9] A. Vailaya, "What's All the Buzz Around "Big Data?""", IEEE Women in Engineering Magazine, December 2012, pp. 24-31
- [10] B. Brown, M. Chui and J. Manyika, "Are you Ready for the era of 'Big Data'? " McKinsey Quarterly, McKinsey Global Institute, October 2011
- [11] B. Gerhardt, K. Griffin and R. Klemann, "Unlocking Value in the Fragmented World of Big Data Analytics", Cisco Internet Business Solutions Group, June 2012, <http://www.cisco.com/web/about/ac79/docs/sp/Information-Infomediaries.Pdf>
- [12] C. Eaton, D. Deroos, T. Deutsch, G. Lapis and P. C. Zikopoulos, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Mc Graw-Hill Companies, 978-0-07-179053-6, 2012
- [13] E. Begoli and J. Horey, "Design Principles for Effective Knowledge Discovery from Big Data", Software Architecture (WICSA) and European Conference on Software Architecture (ECSA) Joint Working IEEE/IFIP Conference on, Helsinki, August 2012
- [14] Intel IT Center, "Peer Research: Big Data Analytics", Intel's IT Manager Survey on How Organizations Are Using Big Data, August 2012, <http://www.intel.com/content/dam/www/public/us/en/documents/reports/data-insights-peer-research-report.Pdf>
- [15] J. Manyika, M. Chui, B. Brown, J. Bughin, R. Dobbs, C. Roxburgh and A. H. Byers, "Big data: The next frontier for innovation, competition, and productivity", McKinseyGlobal Institute, 2011, <http://www.mckinsey.com/~media/McKinsey/dotcom/Insights%20and%20pubs/MGI/Research/technology%20and%20Innovation/Big%20Data/MGI-big-data-full-report.Ashx>
- [16] K. Bakshi, "Considerations for Big Data: Architecture and Approach", Aerospace Conference IEEE, Big Sky Montana, March 2012