

Relationship between Data Science and Development of Business

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I. INTRODUCTION

For a very simple understanding data science is basically a process which combines structured and unstructured data to find out hidden patterns and then analyze those patterns which helps a business to understand that what is the trend and what future decisions it has to take for the growth and development. Data science is an interdisciplinary subject which helps all those areas, networks who have to use numbers and variables to identify some kind of pattern in some kind of data. So, in this way data science comes in use for business houses in great manner as it helps the businesses to understand the patterns of various data collected by using various algorithms and hence helping the business to take decisions and to identify various development and growth opportunities [5], [6]. Data science has helped the businesses to understand that data collection and data analysis is a becoming a very important function for the businesses and holds a very important place in planning and execution part also. Business analytics and data science has been a very upcoming technology and it helps the business in many ways like analysis of data, representation of data, understanding the results of analyzed data. Today's business world is becoming a world which is highly dependent on data and then the other part is analysis of data. So, data science comes with the solution of analyzing and understanding the analyzed data. Data analysis is becoming a new job opportunity also but the problem is it is very limited and an expensive study and perfect for only those persons who love dealing with numbers and their analysis part [7], [8]. But data science and data analysis is giving huge development and competitive opportunities for many business houses and such developments are bringing many changes in the businesses and even helping the businesses to scan the business environment from many different viewpoints. It helps the business to absorb the information in many ways like scanning of data, analysis of data etc. This is making a very much data driven culture all

around the business houses and different economies. It helps a business to realize their potential to the maximum level. And this concept of business analytics is not a new concept for the business but these days this concept is getting the required importance from the businesses and businesses also understand the future of this technology. Hence looking at the present scenario and looking at the scope of future this data science can play an important role in the development of businesses [9], [17]. The future is more of data driven and data is the future oriented and this orientation can bring opportunities for the businesses. The data science can bring more and more innovation for the businesses networks and businesses can touch new heights in terms of growth and development.

The above figure clearly gives an understanding that why data sciences is important for a business from financial benefit point of view and following points can be explained through above figure

- Data science helps a business to identify new opportunities for a business in a very quick time.
- Data science helps to increase staff efficiency as data science is capable enough to identify weak areas and strong areas and it becomes easy for the management to take decisions according to the results identified by the data science.
- As data science uses various algorithms and gives a quick and real time result of the data it gives an easy understanding to the management about the lagging areas and the areas which are performing better for the organization and hence management can take decisions accordingly.
- As data science is capable to handle numerous data and above that it gives real and quick results for the data which helps the business and management to understand the SWOT analysis more minutely and they can even work on the SWOT of their competitors hence



FIGURE 1: Financial Business Benefits from Data Science [1]

giving the business an edge over the competitors.

From figure-2 it is very much clear that data science has multiple uses for a business and a business in upcoming years is largely dependent upon the data sciences and its usage then further the benefits it can derive from the data science to overcome the challenges. Following are the few uses of data science for the business.

- Customer services will get improved as the data collected by the sales team will be analyzed by the most modified algorithms and from these algorithms it will be easy to analyze the trends and patterns which are currently running in the market and on the basis of these trends and patterns the company can take decision for their future products and customization it want to deliver to the customers.
- Financial data analysis will be more accurate as these advanced algorithms will be easy to identify the exact financial situation about the company to the top management and on the basis of these analyses the company can take decision related to their future growth and development programs.
- Data science helps the businesses to tackle those situations where a business faces those problems which happen due to manual data entries and sometimes those entries or those mistakes are not even found on verifications and re-verifications. So, data science comes to the solution and overtakes such manual errors and helps a business to reach a certain decision-making point.
- Data sciences can be used to make the blue prints for the advertisements and these
- Advertisements are more effective, entertaining and eye clinching. Which further reduces the head ache of the business houses that what new ideas or what out of the box thinking can be provided.
- Further based on the market trends like buying behavior

of the customers, Demand and sales forecasting data sciences helps the business to understand that what kind of raw material and in what quantity it is required and further it eases the problem that how much quantity should be produced and based on such accurate calculations a business can take decision that how much production and storage capacity should be planned so that blockage in form of inventory can be controlled.

- Data science in particular is doing a magnificent job for making the businesses to understand that even working at minute levels and rectifying the errors at the start will make the businesses to look very much updated and if the businesses do not use [3], [18], [21].
- The paper on the security of Android banking mobile apps may highlight how data science techniques can be used to address security challenges. For example, data science may be employed to analyze large datasets of user behavior and app usage patterns to detect anomalies or potential security breaches. Machine learning models may be developed to identify malicious activities or unauthorized access attempts. Additionally, data science may be used to encrypt and protect sensitive user data, authenticate users, and implement robust security measures to safeguard against cyber threats [4], [19], [20].

II. REVIEW OF LITERATURE

Raghupathi & Raghupathi (2014) [10] – In this research and application it was found that data science is a very fast-growing field and data scientists are working on many algorithms so that data can be processed in optimized manner and giving most accurate results to the company. Data is the most important part of the business and it majorly acts as the real intangible asset of the business and it should be given equal respect as other assets, investors and customers receive.



FIGURE 2: Data science for Business [2]

Data science helps in the optimization of the business and once the business starts working in the optimized form it will bring in lot of fortunes and other opportunities. Barton and Court (2012) [11] – According to this research using data science is a very challenging job as usage of data science creates very competitive environment as numbers and figures and their results are used as status to define where business stands and to use data science it requires a very competitive mindset and work culture for the businesses.

Muller et al (2018) [12] – According to this research data science has developed the businesses to be more opportunistic and helps them achieve new heights by providing the insights of data which helps an organization to understand its position.

The relationship between data science and the development of business is thus evident in the context of metaverse security and privacy, where data science techniques can contribute to the formulation of a sustainable framework to address opportunities and challenges in ensuring secure and private virtual reality experiences [13].

The paper on mobile cloud computing and sustainable development may explore how leveraging cloud computing in mobile applications can contribute to sustainable development by reducing energy consumption, optimizing resource utilization, and enabling remote access to services and resources. It may discuss the opportunities and challenges associated with integrating mobile computing and cloud computing for sustainable development, such as the need for robust security and privacy measures, scalable infrastructure, and efficient data management [14].

The Analysis & Prognosis of Sustainable Development Goals using Big Data-based Approach during COVID-19 Pandemic and Relationship between Data Science and Development of Business may share commonalities in terms of their focus on the application of data science in addressing societal challenges and driving business development [15]. The approach to revamp data security using cryptographic techniques can greatly benefit the development of business strategies in today's data-driven world. Cryptography, which

involves the use of mathematical algorithms to secure data and protect it from unauthorized access, plays a crucial role in ensuring the confidentiality, integrity, and authenticity of sensitive information [16]. the IT workforce has a significant impact on the returns to IT innovation, particularly in the domain of big data analytics. Skilled IT professionals, armed with data science expertise, can drive innovation, develop cutting-edge technologies, and uncover business opportunities that contribute to the development of business in the context of big data analytics [22].

Through data science approaches, data scientists can analyze large datasets related to COVID-19 immunization, including vaccine availability, distribution, administration, and efficacy. By applying data-driven techniques such as statistical analysis, machine learning, and data visualization, data scientists can gain insights into the effectiveness of the immunization process, identify areas for improvement, and inform evidence-based policy decisions [23].

III. RESEARCH METHODOLOGY

All the secondary data is used to find the relationship between data science and development of business while understanding the importance of data science for the business development.

Objective of the study: To study the relationship between data science and development of business

IV. DISCUSSION

The following applications and points are bases of discussion to understand how big relationship between data science and businesses is there.

- In today's world data is the only thing which helps the business to understand its own position and position of its competitors and on the basis of this data analysis the businesses can run themselves on the path of growth and development as data science helps in identifying the opportunities for the businesses.
- Data science uses algorithms which give a real time pattern analysis for the data and it even does not matter

whether the data is structured or unstructured but the results are quick and these quick results give some extra benefit to the top management in making decisions.

- Data science is like a new window to look into the world but with the eyes which has sense to identify that what is going in the market and what is their situation in the market and how to attract new customers and investors also the techniques to overcome the competitors.
- Data science holds a very important part in planning and execution part for the business.
- Data science helps the top management to manage the business in most effective and efficient way so that best outputs can be achieved.
- Before executing the decision in the practical form, the same simulation can be done on the data science and various algorithms from which a business can reach and understand the point that what the results which will be achieved are and to improve the results what changes should be made.
- Data sciences to develop the businesses have helped many processes to become automatic in nature and get some better results.
- The paper on the relationship between data science and the development of business may discuss how data science techniques, such as data analytics, machine learning, and artificial intelligence, can be applied in business contexts to extract insights from large datasets, make data-driven decisions, and gain a competitive edge. It may explore the potential synergies between data science and BCI [24] technology, where BCI data could be integrated with traditional business data to enable more personalized and immersive user experiences, enhance customer engagement, and optimize business processes [25].
- The paper on edge computing in cloud computing environment may explore the emerging paradigm of edge computing, which involves processing and analyzing data at the edge of the network, closer to the data source, to reduce latency, enhance scalability, and improve efficiency. It may discuss the opportunities and challenges of implementing edge computing in the context of cloud computing, such as leveraging edge resources for real-time data processing, enabling edge intelligence, and addressing security and privacy concerns [26]
- Data science can be utilized to analyze and process large amounts of data related to the performance, power consumption, and reliability of reconfigurable embedded systems. By leveraging data-driven techniques, such as statistical analysis, machine learning, and simulation, data scientists can identify patterns, trends, and insights that can inform the architectural modeling process [27].
- The paper on the relationship between data science and the development of business may examine the role of data science in driving business development. It may discuss how data science techniques, including machine learning, data analytics, and predictive modeling, can

be used to analyze large datasets, extract insights, and make data-driven decisions for improving business operations, customer experience, and competitive advantage [28].

- The relationship between data science and the development of business may investigate how data science techniques can drive business development. It may explore how data science, including machine learning, data analytics, and big data processing, can be used to analyze and derive insights from large datasets, optimize business processes, and make data-driven decisions for strategic planning, marketing, and customer engagement [29].
- Relationship between data science and business development may discuss how data science can play a crucial role in driving business growth and success. It may explore the ways in which data science techniques can be leveraged to gain insights from big data, make data-driven decisions, and unlock new business opportunities. The paper may highlight the importance of data science in areas such as customer analytics, market research, supply chain optimization, and product development, and how data-driven strategies can lead to improved business outcomes [15] [26].

V. CONCLUSION

Data Science is such a big revolutionary technology which can be used as strong weapon by the businesses to hunt down the competitors easily of course the good technology requires a good amount of the investment but once such investment is done it gives a long term returns to the business making their ROI very successful. And with all such success points more and more investors are attracted towards the business and business gets more and more reliable with effective and huge pool of funds. Not only on the usage basis but on the employment basis also data science and data analysis is providing a good opportunity which has been identified in many researches. Data science has a very huge and positive impact on the development of the businesses and businesses are also using such technologies for their own betterment. The future scope is too much for those businesses which are using or trying to use this technology and want to sustain themselves in the competition. Data science has helped many operations to become automatic in nature and data science has helped many problems like manual data entry mistakes, re-verification of the work and unknowing results of the decision taken. Data sciences has helped to understand that even working at minute level is the need of the hour and even maintaining the standards at minute level improves the standards of the business and makes a business to take leap in the competition. Data Science has created a great scope for the businesses in the future and it is making the businesses to get futuristic and then to achieve the unachievable. Hence data science holds the importance for every industry and every business as it is also helping the businesses to get automatic in nature and trying to make these automatic things

to work with minimum to zero mistakes.

REFERENCES

- [1] Data Science in Finance: 6 Use Cases that Changed the Industry. (2021, April 20). Innovecs. <https://innovecs.com/blog/data-science-in-finance/>
- [2] Team, D. F. (2021, April 2). Data Science for business - 7 major implementations of data science in businesses. DataFlair. Retrieved April 15, 2023, from <https://data-flair.training/blogs/data-science-for-business/>
- [3] Thomas H. Davenport and D.J. Patil. Data scientist: The sexiest job of the 21st century. *Harvard Business Review*, October 2012. Available: <http://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century/>.
- [4] Singh, S. K., Sharma, S. K., Singla, D., & Gill, S. S. (2022). Evolving Requirements and Application of SDN and IoT in the Context of Industry 4.0, Blockchain and Artificial Intelligence. *Software Defined Networks: Architecture and Applications*, 427-496.
- [5] A. Mishra (2023) Homomorphic Encryption: Securing Sensitive Data in the Age of Cloud Computing, *Insights2Techinfo*, pp.1
- [6] K.T. Chui (2023) Trusted Access Control: Securing Data with Proper Authorization, *Insights2Techinfo*, pp.1
- [7] A. Mishra (2023) Data Poisoning Attack: Understanding the Threat and Defending Against It, *Insights2Techinfo*, pp.1
- [8] Gupta, B. B., Yamaguchi, S., Agrawal, D. P. (2018). Advances in security and privacy of multimedia big data in mobile and cloud computing. *Multimedia Tools and Applications*, 77, 9203-9208.
- [9] Xu, Z., He, D., Vijayakumar, P., Gupta, B., Shen, J. (2021). Certificateless public auditing scheme with data privacy and dynamics in group user model of cloud-assisted medical wsns. *IEEE Journal of Biomedical and Health Informatics*.
- [10] Raghupathi W, Raghupathi V. Big data analytics in healthcare: promise and potential. *Health Inf Sci Syst*. 2014 Feb 7;2:3. doi: 10.1186/2047-2501-2-3. PMID: 25825667; PMCID: PMC4341817.
- [11] Barton D, Court D. Making advanced analytics work for you. *Harv Bus Rev*. 2012 Oct;90(10):78-83, 128. PMID: 23074867.
- [12] Müller, J. M., Buliga, O., & Voigt, K. I. (2018). Fortune favors the prepared: How SMEs approach business model innovations in Industry 4.0. *Technological Forecasting and Social Change*, 132, 2-17.
- [13] Singh, M., Singh, S.K., Kumar, S., Madan, U., Maan, T. (2023). Sustainable Framework for Metaverse Security and Privacy: Opportunities and Challenges. In: Nedjah, N., Martínez Pérez, G., Gupta, B.B. (eds) *International Conference on Cyber Security, Privacy and Networking (ICSPN 2022)*. ICSPN 2021. *Lecture Notes in Networks and Systems*, vol 599. Springer, Cham. https://doi.org/10.1007/978-3-031-22018-0_30
- [14] Peñalvo, F. J. G., Sharma, A., Chhabra, A., Singh, S. K., Kumar, S., Arya, V., & Gaurav, A. (2022). Mobile cloud computing and sustainable development: Opportunities, challenges, and future directions. *International Journal of Cloud Applications and Computing (IJCAC)*, 12(1), 1-20.
- [15] A. Sharma et al., "Fuzzy Based Clustering of Consumers' Big Data in Industrial Applications," 2023 IEEE International Conference on Consumer Electronics (ICCE), Las Vegas, NV, USA, 2023, pp. 01-03, doi: 10.1109/ICCE56470.2023.10043451.
- [16] C Diwan, SK Singh, An Approach To Revamp The Data Security Using Cryptographic Techniques. *International Journal of Advanced Research in Computer Science*. Jul/Aug2017, Vol. 8 Issue 7, p476-479. 4p, DOI: 10.26483/ijarcs.v8i7.4284.
- [17] Choi, C., Wang, T., Esposito, C., Gupta, B. B., & Lee, K. (2021). Sensored semantic annotation for traffic control based on knowledge inference in video. *IEEE Sensors Journal*, 21(10), 11758-11768.
- [18] Yadav, U. S., Gupta, B. B., Peraković, D., Peñalvo, F. J. G., & Cvitić, I. (2022). Security and privacy of cloud-based online social media: A survey. In *Sustainable management of manufacturing systems in industry 4.0* (pp. 213-236). Cham: Springer International Publishing.
- [19] GAURAV, A., Chui, K. A., & COLACE, F. (2022). Quantum Computing: A Tool in Big Data Analytics. *Cyber Security Insights Magazine, Insights2Techinfo*, 3, 10-14.
- [20] Gupta, B. B., Gaurav, A., Panigrahi, P. K., et al. (2023). Analysis of artificial intelligence-based technologies and approaches on sustainable entrepreneurship. *Technological Forecasting and Social Change*, 186, 122152.
- [21] Peñalvo, F. J. G., Sharma, A., Chhabra, A., Singh, S. K., Kumar, S., Arya, V., & Gaurav, A. (2022). Mobile cloud computing and sustainable development: Opportunities, challenges, and future directions. *International Journal of Cloud Applications and Computing (IJCAC)*, 12(1), 1-20.
- [22] Prasanna Tambe. How the IT workforce affects returns to IT innovation: Evidence from big data analytics. Working Paper, NYU Stern, 2012.
- [23] Chopra, M., Singh, S. K., Mengi, G., & Gupta, D. (2021, December). Assess and Analysis Covid-19 Immunization Process: A Data Science Approach to make India self-reliant and safe. In *International Conference on Smart Systems and Advanced Computing (Syscom-2021)*.
- [24] Kumar, S., & Singh, S. K. (2021). Brain Computer Interaction (BCI): A Way to Interact with Brain Waves. *Insights2Techinfo*, pp. 1.
- [25] Singh, K., Setia, H., & Kumar, S. (2021, December). Wi-Vi and Li-Fi based framework for Human Identification and Vital Signs Detection through Walls. In *International Conference on Smart Systems and Advanced Computing (Syscom-2021)*.
- [26] Singh, S. K., Bhatia, M. P. S., & Jindal, R. (2009). Architectural modeling for hardware and software in reconfigurable embedded system. *International Journal of Recent Trends in Engineering*, 1(1), 575.
- [27] Sharma, A., Singh, S. K., Kumar, S., Chhabra, A., & Gupta, S. (2023, February). Security of Android Banking Mobile Apps: Challenges and Opportunities. In *International Conference on Cyber Security, Privacy and Networking (ICSPN 2022)* (pp. 406-416). Cham: Springer International Publishing.
- [28] Aggarwal, K., Singh, S. K., Chopra, M., Kumar, S., & Colace, F. (2022). Deep learning in robotics for strengthening industry 4.0.: opportunities, challenges and future directions. *Robotics and AI for Cybersecurity and Critical Infrastructure in Smart Cities*, 1-19.
- [29] Provost, Foster & Fawcett, Tom. (2013). Data Science and Its Relationship to Big Data and Data-Driven Decision Making. *Big Data*. 1. 10.1089/big.2013.1508.