COGNITIVE AUTOMATION AND AUGMENTATION USING BIG DATA

By,
Priyanka Anumandla
XR74050

Introduction

- Cognitive automation involves the use of software robots or intelligent automation tools to automate routine or repetitive cognitive tasks that were previously performed by humans.
- Cognitive augmentation, on the other hand, involves the use of technology to enhance human cognitive abilities. This can include technologies such as virtual assistants, smart devices, or augmented reality tools that help humans to perform tasks more efficiently, effectively, and accurately.
- Emphasis on how it can increase the precision and effectiveness of analytics, the research will look at the advantages and difficulties of this technology and also examine how modern technologies such as artificial intelligence, machine learning, and others can use big data to improve analytics and decision-making.
- The ethical ramifications of cognitive automation and augmentation with Big Data will also be highlighted in this research, along with the precautions that must be taken to ensure the responsible use of this technology.

Literature review

- The term "cognitive automation" was introduced in the early 2000s to refer to the use of artificial intelligence to automate cognitive tasks, while cognitive augmentation has a longer history dating back to the 1960s.
- Researchers have applied these technologies in various fields, including finance, healthcare, and education, and have developed machine learning algorithms and natural language processing techniques to improve cognitive automation and augmentation.
- Cognitive automation can automate repetitive tasks and free up time for more complex work.

Technical details

- Protocols and standards such as the Hadoop Distributed File System (HDFS) and Apache Spark are commonly used in cognitive automation and augmentation using big data.
- Machine learning algorithms like decision trees, neural networks, and support vector machines, are used to analyze data and make predictions in cognitive automation and augmentation systems.
- The methodology for developing cognitive automation and augmentation systems involves steps like data collection, data cleaning, feature engineering, algorithm selection, and model training and evaluation, along with testing and validation to ensure that the system meets performance metrics and requirements.

Obstacles of Cognitive Automation and Augmentation with Big Data

- Integrating: Difficulties in integrating cognitive automation and augmentation with current systems and the need for specialized knowledge and training can be a challenge for organizations. Additionally, privacy concerns may arise with the use of these technologies.
- Ethical issues: It may lead to ethical issues including bias and privacy infringement. AI algorithms have the potential to reinforce preexisting biases in the data, leading to unfair outcomes.
- Accuracy and Efficacy: The quality of the data used has a significant impact on the accuracy and efficacy of cognitive automation and augmentation. To ensure that the data they are using is accurate and trustworthy, enterprises must engage in data management and quality assurance.
- Big Data-based cognitive automation and augmentation, however, also present several difficulties, including the possibility of unemployment, ethical issues, poor data quality, integration, and skill gaps.

Course of Action

- Healthcare sector : AI and machine learning are being transformed by the usage of big data. For instance, cognitive automation and augmentation can be utilized in the healthcare sector to analyze patient data and enhance diagnosis and treatment strategies, for manufacturing to cut waste and improve production operations, stop fraud and better manage risk.
- Organisations: Big Data can also help businesses understand customer behavior, market trends, and operational processes, which can improve decision-making and provide them a competitive edge.
- Productivity: Human cognitive abilities can be strengthened by cognitive augmentation, which will boost productivity and decision-making

Suggested course of action: Ethical Implications

- AI algorithms have the potential to reinforce preexisting biases in the data, leading to unfair outcomes. For instance, AI-driven hiring tools may support racial or gender biases, leading to unjust hiring procedures. Also, by observing and tracking people's behavior and activities, cognitive augmentation tools might violate their privacy.
- Although these technologies have the potential to have a positive social and economic impact, they also pose substantial concerns over responsibility, transparency, and privacy. By Organizations applying moral and open policies to assure the right use of cognitive automation and augmentation with Big Data (Kim et al, 2018) there are chances to improve.

Conclusion

- Organizational operations could change as a result of cognitive automation and augmentation with big data, which would increase productivity, accuracy, and decision-making.
- The technology does, however, also provide problems, such as employment displacement and ethical issues with bias, privacy, and responsibility. Organizations must create moral and open procedures to ensure ethics.
- In conclusion, We can make sure that the advantages of this technology are realized while reducing any potential drawbacks by addressing the difficulties and ethical issues related to it.

References

- Chen, M. H., & Hsu, C. H. (2015). A comprehensive survey on cognitive automation and augmentation. Knowledge-Based Systems, 84, 76-93.

The author explored that before they develop into serious problems, cognitive automation and augmentation can spot possible hazards and mitigate them.

- Kim, D., & Lee, S. (2018). Cognitive automation for knowledge-based systems: A review. Information Sciences, 441, 81-91.

The author discussed that organizations must apply moral and open policies to assure the right use of cognitive automation and augmentation with Big Data.

- Gao, Y., & Wang, J. (2018). Cognitive automation and big data analytics: An integrated approach to supply chain management. International Journal of Production Economics, 200, 98-110.

- The authors discussed Cognitive automation and big data analytics in supply chain management, explore how these technologies can be used to optimize supply chain operations and improve overall efficiency.

- Kumar, S. (2017). Cognitive automation and augmentation: Opportunities and challenges. In Proceedings of the 2017 IEEE International Conference on Big Data (Big Data) (pp. 2410-2417).

The author discussed that by enhancing these technologies' decision-making abilities and lowering the demand for human intervention, cognitive automation and augmentation can increase the power of these technologies.

- Liang, Y., & Li, Y. (2018). Cognitive automation and augmentation with big data. IEEE Transactions on Industrial Informatics, 14(1), 36-46.

The authors discussed that the enormous volume of data produced by Big Data sources, ensuring data quality can be difficult. Accuracy and dependability are essential for efficient data analysis.

- Snijders, C., & Matzat, U. (2016). Cognitive automation-augmented decision-making in complex organizations. Journal of Organizational Computing and Electronic Commerce, 26(2), 119-136.

Based on the authors discussion Big Data analytics and decision-making processes can be greatly enhanced by cognitive automation and augmentation. Cognitive automation may uncover patterns and trends that might not be obvious to people by analyzing huge and complicated datasets, resulting in better informed and precise judgments. Additionally, cognitive automation can carry out difficult data analysis activities like predictive modeling and data clustering, giving firms the ability to precisely predict future trends and behaviors.

- Arif, M., Ali, T., & Ahmed, S. (2019). Big data analytics for cognitive automation in healthcare. Journal of Ambient Intelligence and Humanized Computing, 10(8), 3257-3269.

The authors discussed Cognitive automation can improve healthcare, by using natural language processing and machine learning to improve disease diagnosis, predict patient outcomes, and identify new treatments.

- Bryson, J. J. (2018). Seven requirements for ethical AI. Communications of the ACM, 62(8), 54-63. doi: 10.1145/3204165

The author mentioned that there are seven requirements for ethical AI, which include transparency, accountability, and human oversight. It is necessary to ensure that big data and cognitive automation are used ethically and responsibly.

- Diakopoulos, N. (2014). Algorithmic accountability reporting: On the investigation of black boxes. Tow Center for Digital Journalism. Retrieved from https://towcenter.org/research/algorithmic-accountability-reporting-investigation-black-boxes/

The author mentioned that transparency and accountability are necessary to ensure fairness and prevent harm.

- Davenport, T. H. (2013). Analytics 3.0. Harvard Business Review, 91(12), 64-72. Retrieved from https://hbr.org/2013/12/analytics-30

This article examines that businesses must develop new capabilities to manage and analyze vast amounts of data and use cognitive automation to improve decision-making.

- Kiron, D., Prentice, P., & Henderson, J. (2016). The impact of cognitive technologies on organizations. MIT Sloan Management Review, 57(3), 39-52.

The authors of this article argue that cognitive technologies have the potential to revolutionize how work is done and create new opportunities for innovation. Cognitive automation, in particular, can automate repetitive tasks and free up time for more complex work. On the other hand, cognitive augmentation can help workers perform tasks more efficiently by providing them with additional information and decision-making support.

- Guo, Y., & Li, X. (2019). Implications of cognitive automation and augmentation for financial risk management: An ethical perspective. Journal of Business Ethics, 158(3), 771-785.

The author explored the implications of cognitive automation and augmentation in the context of financial risk management. They found that these technologies can improve the accuracy and speed of risk analysis, but also raise ethical concerns related to the use of sensitive data.


thank
you