

## The Brain and Bytes: Understanding Human Cognition and AI

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### ABSTRACT

Cognitive abilities enable individuals to acquire knowledge and understanding through thoughts and experiences, guiding behavior based on what we perceive, store, and utilize. Artificial Intelligence (AI) is a technology that performs various functions, such as data analysis, translation, and understanding, and has become a key aspect of modern innovation, assisting in numerous fields. AI is developed taking inspiration from human cognitive functions. The development of information processing theory led to the creation of computers, with researchers like Herbert Simon demonstrating that machines could replicate human intelligence. Ultimately, AI aims to enhance and simulate human cognition through technological advancements and research. This study has compared human cognition and AI, with secondary data extracted from 31 research papers published between 2015 and the present year. The literature was searched from PubMed and Google Scholar. Both human cognition and AI process information in a similar way by receiving input, analyzing it, and generating output. However, humans rely on senses, emotions, and consciousness, while AI depends on data, algorithms, and machine learning. While both systems learn from feedback and recognize patterns, they function differently. Human cognition is driven by self-awareness, intuition, and social context, enabling creativity, empathy, and ethical decision-making, while AI operates under fixed rules and lacks emotions. AI brings significant advancements but also raises challenges, impacting cognition, privacy, ethics, and employment. A balance between innovation and human values needs to be struck carefully. Integrating human cognition with AI can enhance knowledge, leading to progress in fields like healthcare, education, and communication. AI can support improvements in cognitive abilities such as memory and learning, helping humans fully utilize their intellectual abilities. The study concludes that integrating human brain functions with AI offers exciting possibilities for innovation. However, a focus on ethical concerns and societal impacts in this emerging field is needed. The study highlights AI's potential in decoding brain functions and interpreting brain signals, which can provide valuable insights for diagnosing and treating brain dysfunction. A combination of human cognition with AI errors can reduce errors, leading to better healthcare and technological advancements. Ethical application is key to ensuring AI serves humanity safely and responsibly. This study's limitations include its reliance on secondary data and its theoretical focus. Future research should employ empirical methods and diverse approaches to close knowledge gaps and improve the validity and reliability of findings.

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Cognition is the mental process of perception, memory, learning, problem solving, and language acquisition. It involves gaining knowledge and understanding through thoughts, experience, and the senses. It includes what we take in, store, and use to guide our behavior. Artificial Intelligence (AI) is a group of technologies that perform different functions, such as understanding, translating, and analyzing data. AI is an important part of modern innovation that helps people and supports many varied fields. It is based on domains of cognitive psychology such as memory, learning, decision-making, and problem-solving.

- **Human cognition**

‘Cognition’ is rooted in the Latin word ‘cognoscere’, which means to ‘get to know’. Cognition helps us understand the world around us and interact with the environment. The information received from sensory organs is huge, needs to be filtered, refined, and used for our everyday life. Cognition involves acquiring knowledge, so any system that "knows" something can be considered cognitive (Gershenson, 2003).

Siemens et al. (2022) defined cognition as “*the sensory processes, general operations, and complex integrated activities involved in interacting with information.*” Sensory processes encompass vision, perception, and attention. Core cognitive functions include language, memory, recognition, recall, and behaviors related to seeking and managing information. Higher-level integrated activities involve reasoning, judgment, decision-making, problem-solving, sensemaking, and creativity.

Since the origin of our species in sub-Saharan Africa around 200,000 years ago, culture has outdone genetics as the key factor of human evolution, shaping our brains, cognitive skills, and even gene distributions (Bender, 2020). This makes humans uniquely cognitive animals, with abilities that have shaped complex political, economic, and cultural lives. Distinct from earlier views, recent research sees human cognitive evolution as gradual and shaped by cultural, technological, and sociocultural evolution. With an interdisciplinary approach of biology, neuroscience, anthropology, and many more, it highlights shared traits with other species and the uniqueness of human cognition (Heyes, 2012).

The roots of cognition are in the brain, where 100 billion neurons form thousands of connections. Cognitive processes are controlled by specific parts of the brain and neurotransmitters like dopamine, serotonin, etc. Cognition evolves constantly across the lifespan, shaped by genetic and environmental factors, which start even before birth. It develops during childhood and declines with age due to the deterioration of neurons (Cambridge Cognition).

The term "cognition" is studied in multiple fields like neuroscience, philosophy, and psychology. Its meaning changes depending on the context. In psychology, it refers to neural information processing, while in social psychology, "social cognition" focuses on attitudes and group dynamics. Cognitive science, a relatively new interdisciplinary field that integrates diverse approaches to understand mental processes. In computer science, the idea of human cognition is used to create systems that replicate or enhance human thinking and learning in insightful ways (Andrade and Walker, 2025).

- **Levels of Processing Theory**

This model of human thinking and learning emphasizes the role of mental processes in behavior. Inspired by computers, this model views the mind as a system that processes information through internal conditions (Sucharitha et al., 2020). One of the theories developed by Craik and Lockhart (1972) is called as Levels of Processing Theory. According to this theory, information is developed at different levels depending on the characteristics, concentration, and meaningfulness.

- **Stage theory**

Another theory is stage theory, given by Atkinson and Shiffrin (1968), states that learning and memory occur stagewise. This model suggests three stages of memory: sensory, short-term, and long-term memory. When information enters through sensory organs, it is transferred to the short-term memory if attention is paid to it, otherwise, it fades away. If we rehearse that information, then it is sent to long-term memory. If it is not processed, it is gone. Long-term memory is the permanent storage, where the information is stored for days, months, years, or sometimes for a lifetime. We can retrieve the information stored in our long-term memory system.

These information processing theories compare the human mind to a computer, suggesting that the brain screens new information before storing it in memory. This process happens so quickly that we are unaware of it. Just as computer hardware and software handle data, our senses act like hardware, while our learning strategies function like software. Improving these components can enhance how we process information.

- **Emergence of Artificial Intelligence (AI)**

Information processing theory emerged in the 1950s alongside rapid computer development. Herbert Simon and colleagues showed that computers could simulate human intelligence. Driven by curiosity, humans created machines capable of reasoning, problem-solving, language understanding, and learning, the abilities that define Artificial Intelligence (AI). Marvin Minsky described AI as enabling machines to perform tasks requiring human intelligence. Despite different definitions of AI, it broadly focuses on simulating and enhancing human intelligence through research and technology. Like steam engines, electricity, and computers in past eras, AI is now a central force shaping our modern world and its future (Jiang et al., 2022). The term "Artificial Intelligence" itself implies it's a replica of our biological intelligence. As the most intelligent beings known, we view ourselves as rational problem-solvers, relying on experience, intuition, and logic (Korteling et al., 2021).

- **Connectionism Theory of Learning and Intelligence**

This theory explains that thinking and learning can be modeled using artificial neural networks, which are inspired by how the human brain works. These networks process information through layers of connected units called neurons. The system learns by adjusting the strength of these connections using input data and special algorithms. Frank Rosenblatt created the first model, called the perceptron. Later, Geoffrey Hinton, Yann LeCun, and Yoshua Bengio improved these networks, leading to deep learning, which has advanced AI in areas like speech, images, and language.

- **Machine learning theory**

Arthur Samuel coined the term "machine learning," which refers to algorithms that enable computers to learn from data and make decisions without explicit programming. It involves

learning types like supervised, unsupervised, and reinforcement learning. AI mimics human thinking by processing information, learning from experience, and making decisions. Neural networks replicate brain functions to recognize patterns, while Natural Language Processing allows machines to understand human language. Inspired by cognitive psychology, AI systems learn through interaction and feedback. Today, AI powers technologies like robots, self-driving cars, facial recognition, and virtual assistants (Balakrishnan et al., 2020).

### ***Objectives and Research Questions***

The present study tries to understand human cognition and AI. How AI is advantageous and disadvantageous for humans is discussed in the study. Based on these objectives, the following research questions are answered:

1. What are the similarities and differences between Human cognition and Artificial intelligence?
2. What are the advantages and disadvantages of artificial intelligence?
3. How will a combination of human cognition and artificial intelligence be helpful for society?

## **MATERIALS AND METHODS**

The researcher focused on key terms for searching the literature. With the PICO (Table no. 3.1), the researcher formulated a well-structured and relevant support of the literature for the present review. Specific factors were carefully considered for inclusion and exclusion criteria to select appropriate studies.

1. The inclusion and exclusion criteria are defined as follows:

### **Inclusion:**

1. Articles published in the English language.
2. The articles published between 2010 and 2024.

### **Exclusion:**

1. Blogs
2. Research published before the application of AI.

This study used a comparative and conceptual approach to explore and differentiate the mechanisms of human cognition from artificial intelligence. A qualitative method was used for data collection. The sample included theoretical literature from peer-reviewed journals, books, and conference proceedings published between 2010 to 2025. Sources were identified using databases such as Google Scholar, PubMed, etc., with search terms including “human cognition”, “AI”. Ethical considerations, including the risks of personifying AI or overestimating its cognitive capabilities, are also acknowledged as part of the conceptual evaluation and discussed about the implications of AI-human interaction frameworks.

## **RESULTS**

The researcher collected data from PubMed and Google Scholar. The researcher separated the literature using inclusion and exclusion criteria to verify the literature. The eligibility of the full-text papers was considered based on the title and abstract. A total of 31 studies are included in the review, which are presented below:

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**Table: 1 Study characteristics**

No.	Author (Year)	Variables studied	Sample characteristics	Research design	Measures used	Findings
1.	Saxena, 2025	Cognitive and Behavioral Neuroscience and AI	Neuroscience findings related to human cognition, behavior, and brain processes as applied to AI models	Conceptual paper	Review	Cognitive and behavioral neuroscience can enhance AI in learning, adaptation, decision-making, memory retention, and human-like interaction.
2.	Yuan et al., 2025	Neural circuits and biological behavior	Rodent and primate models	Theoretical	Literature review	Advances in experimental techniques and computational modeling are required to understand the brain's role in complex behaviors.
3.	Irsic and Gjergjek, 2024	AI and Public Attitude Towards It	Adult citizens of the Republic of Slovenia (n=205-209)	Mixed method	Survey	Negative attitudes toward AI are strongly associated with fear of job loss and privacy concerns.
4.	Malik et al., 2024	AI and Industry Performance	Literature	Theoretical	Literature review	AI is revolutionizing industries by improving energy efficiency, cost-effectiveness, and performance.
5.	Mogi, 2024	Consciousness and Computational Processes	Literature	Theoretical	Conceptual analysis	Use of the Conscious Turing Machine (CTM) to explore conscious phenomena.
6.	Rai et al., 2024	AI and Human Intelligence	Literature	Theoretical	Critical review	Discussed the strengths and weaknesses of AI and Human intelligence
7.	Shekouh et al., 2024	Connectome data and Prognostic	Neuroimaging data and connectome	Theoretical	Systematic review	AI is a powerful tool for extracting

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No.	Author (Year)	Variables studied	Sample characteristics	Research design	Measures used	Findings
		tools for neurological diseases	data			valuable features from connectome data, which is important in the diagnosis and prognosis of neurological diseases and behavioral disorders.
8.	Sydoruk, 2024	AI and Immigrant Integration	Literature	Theoretical	Descriptive research	AI significantly aids the assimilation of vulnerable immigrant groups, facilitating integration into new labor markets and reducing unemployment.
9.	Tripathi, 2024	Use of AI and Its Impact	Literature	Theoretical	Conceptual analysis	AI has widespread and growing use.
10.	Yu et al., 2024	Use of AI in transportation	Literature	Theoretical	White paper	AI risks in transportation can endanger vehicles, passengers, pedestrians, and overall system performance.
11.	Zhai et al., 2024	Over-reliance on AI and the Cognitive abilities of students	Literature	Theoretical	Systematic review	Over-reliance negatively affects cognitive abilities.
12.	Ahmad, 2023	AI and loss in decision making, laziness, and privacy issues	University students (n=285)	Qualitative	PLS-Smart	AI is widely accepted and praised; however, its negative impacts are being ignored.
13.	Ayala-Pazmiño, 2023	AI and Teaching, and Learning Outcomes	Literature	Theoretical	Literature review	AI offers benefits in education.
14.	Choudhary et al., 2023	AI and Human Intelligence	Literature	Qualitative	Conceptual review	How AI and human intelligence interact and evolve together.

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No.	Author (Year)	Variables studied	Sample characteristics	Research design	Measures used	Findings
15.	Fitria, 2023	AI and Teaching and Learning	Literature	Theoretical	Literature review	AI offers significant educational benefits, such as personalized learning, improved assessments, and efficiency for teachers.
16.	Gul et al. 2023	Use of AI and cognitive ability	Teachers and students (n-20)	Mixed method	Semi-structured interviews and questionnaires	AI usage is widespread and regular among participants, with 67% using it daily, and disruptions in access to AI are associated with reduced critical thinking, learning, and problem-solving abilities.
17.	Huang et al., 2023	Use of Large Language Models and deep learning technologies	Literature	Theoretical	Conceptual analysis	LLMs have created major social and security implications.
18.	Masriadi et al., 2023	AI and Human Employment	Literature	Theoretical	Literature review	AI and automation are replacing many human jobs.
19.	Zhang, 2023	Humans and AI	Literature	Theoretical	Review	While AI can imitate certain aspects of human behavior through information processing, fundamental differences, particularly the lack of consciousness, limit its ability to replicate human behavior entirely.
20.	Baeza-Yate and Villoslada, 2022	AI and Human Intelligence	Literature	Theoretical	Comparative	Human and artificial intelligence differ significantly in

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No.	Author (Year)	Variables studied	Sample characteristics	Research design	Measures used	Findings
						functions and capabilities.
21.	Fares, 2022	AI and Brain activity	Literature	Theoretical	Literature review	The integration of AI with BCI offers exciting possibilities, especially in the treatment of neurological and psychiatric disorders.
22.	Jarrahi et al., 2022	AI, Human Intelligence, and Outcomes	Literature	Theoretical	Conceptual analysis	"Hybrid intelligence" arises from synergistic human-AI collaboration.
23.	Kumar, 2022	Integration of AI and neuroscience	Literature	Theoretical	Literature review	AI and neuroscience integration significantly enhances brain-machine interfaces, improving accuracy and efficiency.
24.	Cremer and Kasparov, 2021	AI and Human intelligence augmentation	Literature	Theoretical	Review	Humans and AI can work together.
25.	Korteling et al., 2021	Cognitive constraints, forms of intelligence, and hybrid intelligence	Literature	Theoretical	Comparative analysis	The paper emphasized the importance of recognizing the complementary nature of human and artificial intelligences.
26.	Bhbosale et al., 2020	Use of AI	Literature	Theoretical	Descriptive	Artificial Intelligence is highly beneficial for humans.
27.	Khanam et al., 2020	AI, Human intelligence, and efficiency and effectiveness	Literature	Theoretical	Literature review	AI is highly efficient and has taken over many human tasks, performing them better in some areas.
28.	Borana, 2016	AI, advantages, and disadvantages	Literature	Theoretical	Literature review	AI has a wide range of applications and offers

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No.	Author (Year)	Variables studied	Sample characteristics	Research design	Measures used	Findings
						advantages, such as efficiency and automation, and disadvantages, such as job displacement, ethical issues.
29.	Kamar, 2016	Hybrid Intelligence system, Machines, and human intelligence	Literature	Theoretical	Literature review	Hybrid intelligence systems aim to leverage both human and machine strengths to overcome AI limitations.
30.	Risko and Gilbert, 2016	Cognitive offloading and consequences	Literature	Theoretical	Literature review	Cognitive offloading impact on cognitive performance, highlighting its growing relevance in daily tech use.
31.	Jorden and Mitchell, 2015	New learning algorithm and learning performance	Literature	Theoretical	Descriptive and Conceptual Overview	Machine learning is a rapidly expanding field central to modern AI and data science.

### DISCUSSION

Artificial intelligence has focused on boosting computational power and efficiency, with deep learning excelling in tasks like image recognition and language processing. However, these systems lack the flexibility and adaptive intelligence of humans. Human cognition is structured, allowing abstract reasoning, causal understanding, and rapid learning with minimal data.

- **Similarities and Differences between Human Cognition and AI**

Human cognition and AI work by receiving input, processing it, and producing output. Humans use their senses and the brain, relying on memory and experience. AI uses data and algorithms like logic or machine learning. Both learn from feedback, recognize patterns, and adapt to solve problems. Cognition comes from the brain and involves emotions, intuition, self-awareness, and social influence. It is creative and highly adaptable. In contrast, AI is built by humans using algorithms, lacks emotions and consciousness, and follows fixed rules. It mimics creativity using data and has no intrinsic ethics. Human cognition and artificial intelligence both process information, but through different mechanisms.

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Zhang (2023) mentioned that humans and AI base their behavior on information processing, following a similar pattern: receiving external stimuli, processing the information, and generating a response. Due to differences in their fundamental systems, the same stimuli can lead to different behaviors. AI behavior is limited by its human-designed programming and mechanical structure, allowing for self-learning only within set boundaries. In contrast, human cognition is driven by consciousness, allowing for more flexible and diverse responses, breaking established patterns, and adapting in complex ways.

Consciousness is often defined by self-awareness, intentionality, and subjective experience. Interestingly, while humans can display consciousness without intelligence and AI can show intelligence without consciousness, this suggests the two can exist independently. Certain cognitive functions, like flexible attention, adapting to new contexts, decision-making, and integrating sensory information, happen consciously. In contrast, regular tasks are often performed by humans unconsciously; similarly, AI processes information without awareness (Mogi, 2024).

Unlike humans, AI systems can instantly share learned skills by copying algorithms across devices. While human communication is limited by language and gestures, AI systems connect directly and collaborate seamlessly. They can be rapidly updated, scaled, and reconfigured for new tasks because their capabilities are far beyond human limits. AI and humans rely on pattern recognition to make sense of data and navigate dynamic environments (Korteling et al., 2021). However, while AI excels at processing large datasets and simulating reasoning through algorithms, humans possess unique qualities like creativity, intuition, empathy, and ethical judgment that AI struggles to replicate. Though AI has outperformed humans in several tasks, it will need holistic and contextual thinking like humans. Humans use ‘analogical thinking’, which makes use of prior experiences in new and novel problem-solving (Jordan and Mitchell, 2015).

Humans use emotional and social intelligence according to the situation, which is lacking in AI. Humans use tacit knowledge in decision-making, which consists of wisdom, insight, and intuition, and is accumulated because of experiences gained over time, and cannot be replicated by AI (Jarrahi, Lutz, and Newlands, 2022). Baeza-Yates and Villoslada (2022) stated that AI cannot learn what is not included in the data. Unlike machines, humans can process rich and multi-modal information, allowing for deeper understanding.

Khanam, Tanweer, and Khalid (2020) mentioned that humans interact with verbal and non-verbal communication, which includes emotions, responding to different stimuli, cultural views, and slang. These cannot be coded and recited by machines. They cannot use any basic common sense that humans use in their day-to-day lives.

### • Advantages and Disadvantages of Artificial Intelligence (AI)

Bhbosale et al. (2020) explained that AI can automate tasks like programming and self-modification, reducing human workload and replacing humans in dangerous jobs like mining. It improves accuracy and simplifies daily life through applications like Siri and Google Assistant. However, the drawbacks include high costs, time consumption, and safety concerns due to potential misuse. Borana (2016) mentioned that the key advantage of AI is its ability to make logical, data-driven decisions without emotional bias, offering consistency and objectivity. Unlike humans, AI doesn't need rest and can work continuously. Once trained, it can replicate tasks across systems, saving time. AI is now integrated into fields like medicine, robotics, law, and stock trading, operating autonomously with high

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precision and speed, including in space exploration. This made industries expand and flourish, helping a nation move towards progress.

Tripathi (2024) stated that the growing use of AI in different sectors like healthcare, education, finance, and business offers benefits such as personalized support, mental health help, increased productivity, and stress reduction. Irsic and Gjergjek (2024) mentioned that AI benefits several businesses by providing personalized experiences. Chatbots and virtual assistants help improve customer satisfaction and retention. It reduces the need for staff and saves the costs of appointing human assistants for this work. Though the implementation of AI gave rise to unemployment and widened the economic gap. People are dependent on AI so badly that we cannot function well in case AI is stopped or hindered. Our day-to-day activities, like smartphones, social media, online shopping, GPS, finance, and entertainment, are controlled by AI. In short, AI streamlines daily tasks, customizes experiences, and makes decisions that subtly guide our choices every day.

Huang et al. (2023) discussed different risks imposed by AI. AI technologies in the cognitive domain pose several security risks. Deepfakes and AI-generated misinformation can spread false content, leading to manipulation, social unrest, and loss of trust. AI also threatens privacy through surveillance tools like facial recognition and data mining. Targeted content algorithms can be used to influence beliefs and behavior, increasing the risk of manipulation and radicalization. Additionally, AI enables advanced cyberattacks and is vulnerable to adversarial inputs. Overdependence on AI can reduce critical thinking, human intervention, and adaptability when systems stop. Gul et al. (2023) found that limited use of AI made regular AI users struggle with problem-solving, thinking, focus, learning, and decision-making, leading to stress. Automation may lead to low self-esteem, harming mental well-being, and overreliance on it may reduce self-efficacy.

Ahmed et al. (2023) stated that the overuse and dependency on AI will reduce the capacity of the human brain's thinking, making humans artificial. Risko and Gilbert (2016) explained that *cognitive offloading* means using external devices to reduce the mental effort needed to perform a task. It reduces the cognitive load on human working memory by freeing up resources. However, it reduces the cognitive engagement and skills of individuals. AI offers quick and ready-made solutions, which prevent users from having to perform the cognitive functions required for that task. This ease and convenience affect the problem-solving skill of people not only in education but also in everyday and professional settings. Similarly, Zhai et al. (2024) raised concerns about AI affecting students' cognitive abilities, as most users prefer quick and efficient solutions over slower and more practical ones.

Yu, Hulse, and Irshad (2024) stated that using AI in transportation poses risks that can impact safety, performance, security, privacy, and reliability. Potential hazards include mis-detecting pedestrians or vehicles, incorrect localization, and inaccurate lane detection. These issues can lead to crashes, lane violations, or traffic disruptions, endangering passengers, pedestrians, and other road users. Rai et al. (2024) discussed that privacy is a key concern, as AI depends on large amounts of data, raising issues around how personal information is collected, stored, and used. Cremer and Kasparov (2021) mentioned that history shows we have outsourced tasks to machines. Now, AI handles complex cognitive functions like language and problem-solving. As AI advances, it increasingly outperforms humans, raising concerns that nearly any job could soon be automated.

- **Integration of Human intelligence in AI**

The main goal of AI is to replicate human abilities. Despite advances in AI, it makes mistakes or fails to operate independently. Errors in significant tasks like driving a car may lose user trust and lead to serious consequences, such as loss of life. Hybrid systems can distribute tasks to humans to compensate for AI's limitations. Human input helps prevent mistakes and failures, creating a feedback loop that enables the AI to improve (Kamar, 2016). Choudhary et al. (2023) mentioned that artificial and human intelligence are distinct yet complementary. AI excels at data processing and problem-solving, while humans bring creativity, empathy, and ethics. Instead of viewing AI as a threat, we should embrace it as a partner that enhances our abilities and helps build a better future together.

Human cognition and artificial intelligence both have strengths and weaknesses. Human cognition is creative, emotional, intuitive, and adaptable. On the other hand, it is chaotic. We forget so many things. AI has incomparable memory, logical expertise, and superfast speed; however, it lacks empathy and ethics. If these two establish a synergetic relationship, it will foster an environment where the new generation will thrive. So, rather than getting stuck in the battle between human and AI capabilities, serving them as a powerful tool to strengthen our creativity and make logical decisions will be a wise move. This will help humanity to handle difficult challenges and work on innovations.

While discussing the integration of the human brain and AI in healthcare, Kumar (2022) mentioned that AI enhances brain-machine interfaces (BMIs) by accurately interpreting brain signals, enabling real-time, personalized control of devices. This helps in treating neurological disorders, controlling robotic limbs, and improving how we interact with technology. Saxena (2024) mentioned that using ideas from brain plasticity, memory, social thinking, and live brain data, AI systems could become more flexible, better at understanding people, and more in tune with how we think. Similarly, Shekouh et al. (2024) stated that neurons use ions to send signals, creating electric fields in the brain. The connectome maps these connections and reveals changes in brain disorders. AI can analyze this data to detect patterns and improve diagnosis and treatment.

Yuan, Chen, and Liu (2025) discussed recent developments in brain-inspired models for spatial cognition, showing how combining neuroscience and AI can improve robotics. These models help robots better navigate and adapt to changes, emphasizing the need for AI to support how the brain works. If neuroscience and AI merge, they will drive future progress in both fields. Fares et al. (2022) further mentioned that AI and machine learning help diagnose and treat brain disorders by accessing deeper brain regions for better understanding.

In the education field, the use of AI can provide personalized learning, boost productivity, provide global access to high-quality education, and enhance engagement. AI can also simplify assessment with instant feedback and automate tasks like grading, allowing teachers to focus more on teaching (Ayala-Pazmiño, 2023). Fitria (2021) mentioned that AI enhances the efficiency of teachers, but it cannot replace their unique intelligence. They will remain central to delivering knowledge and fostering character development. AI can complement education without matching human intelligence in education.

In the industrial sector, AI is transforming it by reducing costs, energy use, and risks while boosting performance. It offers solutions across sectors like food, healthcare, e-commerce, and more, improving design and production (Malik, 2024). AI can provide personalized

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education, job market access, and cultural understanding to help immigrants gain relevant skills for successful employment (Sydoruk, 2024). Masriadi et al. (2023) outlined the importance of integrating human-machine collaboration. Adoption of AI depends not only on technical feasibility but also on factors like cost, labor market conditions, business culture, and workforce readiness.

Therefore, merging human cognition with artificial intelligence will help expand knowledge. It can lead to progress in healthcare and communication. AI systems can support enhancement in memory, learning, and decision-making, empowering humans to utilize their full intellectual potential. However, it raises concerns about privacy and safety. By giving access to human thoughts, emotions, and memories, the individual's privacy will be violated by AI systems. Another concern is the loss of autonomy due to dependency on AI systems.

### ***Implications***

The study has many important implications. It offers a new insight into how AI can help decode the human brain and its deep functions and mechanisms. The study contributes to understanding how AI can decode and interpret brain signals. How can it be helpful in healthcare systems, as AI systems help to diagnose neurological conditions? The findings also suggest that AI can be used to develop treatments for brain disorders. Integrating human cognition and AI can help in the reduction of human errors as well as AI's limitations. Human and computer integration enables new interaction modes and devices, shaping the future of technology for the betterment of humanity. While considering ethics, the study can be useful in understanding the potential use of AI systems accurately, fairly, and safely.

### ***Limitations and Recommendations***

This study has certain limitations. It is based on secondary data, limiting its potential for novel discoveries. This study provides a theoretical overview of human cognition and AI. In the future, empirical studies are needed to fill gaps in knowledge or address inconsistencies in the literature. It is recommended that standardized and diverse research methods be used to enhance the validity and reliability of future studies.

## **CONCLUSION**

The present study focused on human cognition and artificial intelligence. Artificial intelligence is today's need; however, it impacts society negatively. Till the 19<sup>th</sup> century, the human brain, its mechanisms, and functions were considered unique, but after the invention of computers, a new intelligence came into existence: artificial intelligence. This proved helpful in all areas, like industries, education, healthcare, and many more. However, concerns like dependency, job loss, ethical and privacy violations, and deterioration in human cognition were raised. The idea of integrating the human brain and AI will open up new possibilities to offer the potential for extraordinary advancements. It will lead to the challenge of ethical considerations. To successfully navigate this emerging field, it is essential to prioritize ethics and address societal concerns. If we can manage this, the possibilities are endless.

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