

Comparing Human Cognitive Process and Deep Learning Models.

- **Problem Statement:**

In recent years, Artificial Intelligence has been progressing vastly, so that deep learning systems can perform tasks like human, such as visual recognition, language processing and decision making. Despite these achievements, there remains a major gap between how humans think and learn and how deep learning models operate. Humans learn from examples, use prior knowledge, reasoning, and creativity to solve new problems, while deep learning system depends on massive datasets, mathematical and statistical patterns.

Some studies show that AI can imitate some aspects of human cognition such as pattern recognition or memory representation but still lacks context awareness and emotional understanding.

And other researchers have proposed theoretical models that parallel between human cognition and neural networks, even though there is no clear explanation of where the two processes converge and where they fundamentally differ.

Therefore, there is a need for research that systematically compares between human cognitive and deep learning mechanisms to identify differences, overlaps and how cognitive science can enhance artificial intelligence development.

- *Research Objectives:*

- *To analyze the core of human cognition, reasoning and adaptation.*
- *To examine the learning mechanisms of deep learning and how they differ from human cognitive process.*
- *To compare the similarities and differences between human cognition and deep learning in terms of flexibility, contextual and creativity.*
- *To evaluate existing models and theories that attempt to align AI Systems with cognitive principle.*
- *To provide recommendations for future AI development that line-up machine learning with human cognitive.*

- *Literature Review:*

The relationship between human cognition and artificial intelligence is a central topic in AI research nowadays. Deep learning achieved an outstanding result in many areas like computer vision and language processing, but questions remain about how closely it is to human thought. “Shangyi Liu and colleagues of hers “suggests that deep learning should be viewed as “Computational phenomenology”, meaning that it learns through exposure to data, like human perception.

Experimental studies “Gloria Re Calegari, Gioele Nasi, Irene Celino” show that machine learning models outperform human in speed and accuracy but struggle with uncertain situation.

“Khan and Ali 2021” explain that deep learning mimics some features of brain function using layered structure but it still reliance on massive datasets. Similarly,” Helning and Balietti 2018” argue that machine learning can achieve efficiency through pattern recognition, but they lack creativity of humans.

All studies show that AI and deep learning have developed rapidly recently, but they still operate in wat that differ from human cognition.

That keeps the challenges open to integrate insights from cognitive science to redesign models that learn more efficiently, reason and adapt dynamically to define true human intelligence.

- References:

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