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AN EVALUATION OF BLOCK'S CRITIQUE OF MACHINE FUNCTIONALITY

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Abstract
Block's critique challenges functionalism's notion that mental states are defined by functional roles, arguing that it neglects consciousness' qualitative aspects (qualia). This raises doubts about machines' capacity for genuine consciousness and understanding, despite mimicking human cognitive functions. This paper examines Ned Block's argument that machines lack genuine intentionality and consciousness, despite functional equivalence to human cognition. In addressing this, the use of descriptive and analytical research methodology is employed through collecting of data from primary and secondary sources. Through a critical analysis of Block's arguments, this study accessed the implications for artificial intelligence, cognitive science, and the philosophy of mind. We consider counterarguments from computationalists and functionalists, and explore the boundaries between machine functionality and genuine consciousness.
Keywords: Ned Block, artificial intelligence, Chinese Room, Philosophy of mind, machine functionality.

Introduction

In the realm of philosophy of mind and cognitive science, Ned Block's critique of machine functionality has sparked instance debate. This is because Block's critique poses a formidable challenge to functionalism, a philosophical framework underpinning artificial intelligence and consciousness debates. Block, a prominent philosopher, challenges the notion that machine can truly think or possess consciousness. Functionalism asserts that mental states are defined by functional roles, rather than physical properties, suggesting any system replicating human mental functions could possess mental states.

However, Block contends that "functionalism overlooks the essential qualitative aspects of consciousness, which are vital for genuine understanding"[89]. This critique raises crucial questions: can machines truly experience consciousness if they lack subjective qualitative experiences? Does functional equivalence suffice for mental state equivalence? How do we reconcile the functional and qualitative dimensions of consciousness? These puzzles point to the far-reaching implications of Block's critique for artificial intelligence research - such as rethinking the notion of "intelligence" in artificial intelligence (AI) systems. Reevaluating the potential for conscious machines. And lastly but not the least, addressing the explanatory gap between functional and qualitative aspects of consciousness.

[89] Block, N. "Two Neural Correlates of Consciousness". In *The Nature of Consciousness: Philosophical Debates* (1995: MIT Press), Pp. 3 - 22.

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Ned Block's seminar critique targets the heart of artificial intelligence, questioning whether machines can genuinely replicate human consciousness. At the core of his argument lies the concept of "qualia" – the subjective, intrinsic qualities of human experience. His thought-provoking "Chinese Nation" scenario illustrates the limitations of machine intelligence. "Even a vast network of individuals simulating understanding through complexing tasks, lack the essential consciousness that defines human cognition" [90]. This points to the fact that Block's seminar critique sparks a profound philosophical exploration into the essence of consciousness and the ethics of attributing mental states to machines. As AI technology accelerates, discerning the boundaries between human cognition and machine functionality becomes paramount.

The Genesis of Artificial Intelligence (AI), Cognitive Revolution and Computability Theory

In the summer of 1956, a pivotal gathering at Dartmouth College in Hanover, New Hampshire, marked the official inception of AI as a distinct field of research. This seminal conference, attended by ten visionary thinkers – including John McCarthy, Claude Shannon, Marvin Minsky, and Arthur Samuel laid the formation for thew exciting developments that would follow. Bringsjord and Arkoudas commenting on this advocated that from the contemporary vantage point, the Dartmouth conference holds profound significance for several reasons: "first was coining the term 'Artificial Intelligence' (John McCarthy introduced the term that would define the field). Second was Logic Theorist (LT). Allen Newell and Herbert Simon unveiled their groundbreaking programme, capable of proving elementary theorems in propositional calculus, demonstrating human-level reasoning in computational system" [91].

However, while the Dartmouth conference and Alan Turning's influential 1950 paper, "Computing Machinery and Intelligence", are often cited as AI's starting points, philosophical precursors date back centuries. Thomas Hobbes (17th century) foreshadowed strong AI by equating reasoning with computation. Gottfried Wilhelm Leibniz (17th century) envisioned a "universal calculus" for resolving disputes through systematic calculation. And Rene Descartes (17th century) contemplated a precursor to the Turning Test, albeit with Skepticism. Rene Descartes proposed two definitive tests to determine whether a machine can truly be considered human-like. At first, he proposed linguistic adaptability where he contended that machines may mimic speech and respond to physical stimuli, but they cannot engage in flexible, context – dependent conversations. According to him, they lack the ability to "arrange words in novel combinations to address unexpected topics and respond appropriately to unforeseen situations"[92]. Even the most basic human intelligence can adapt language to convey thoughts and ideas. Secondly, he proposed versatility and reason. Here machines excels in specific tasks, but their capabilities are limited by

[90] Block, N. "Two Types of Functionalism". In *Philosophy of Mind: A Beginner's Guide* (2003: Oneworld Publications). Pp. 145 – 160.
[91] Bringsjord, S. & K. Arkoudas, "The Philosophical Foundations of Artificial Intelligence". Department of Cognitive Science, Rensselaer Polytechnic Institute, Troy NY 12180 usa (Oct. 25, 2007), P. 13.
[92] Harnad S. "The Cartesian Roots of the Turing Test", Artificial Intelligence, Philosophy of Mind: The Key Thinkers. Edited by A. Bailey, (2014: Bloomsbury Academic), P 46 -60.

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their design. According to him, they "lack the universal applicability of human reasons, rely on specialized mechanisms for each task and fail to demonstrate understanding, instead reacting solely based on programming"[93]. Human reason enables us to adapt to diverse situations, whereas machines are confined to their predetermined functions. Descartes concludes that it is "morally impossible" for machines to replicate human behaviour in all aspects of life. These tests highlight the fundamental differences between human intelligence and machine capabilities. Descartes' tests remain relevant in artificial intelligence research, cognitive science, and philosophy of mind. They challenge researchers to create machines that truly think and adapt like humans.

The Dartmouth conference ignited a chain reaction of innovation, fostering collaborations and inspiring new generations of researchers. Today, AI stands at the forefront of technological advancements, transforming industries and redefining human possibility. As AI continues to evolve, fundamental questions persist such as can machines truly think? What constitutes intelligence? How far can computation replicate human cognition? The Dartmouth conference and its philosophical antecedents remind us that AI's story is one of ongoing discovery, fueled by human curiosity and ingenuity.

Moreover, the ceremonial birthplace of AI may be traced to the 1956 Dartmouth conference, but the intellectual foundations of this field lie at the crossroads of two pivotal 20th – century development. "This paradigm shift overturned behaviourism, reviving mentalistic psychology and recognizing the legitimacy of mental states, such as thoughts, beliefs, and desires"[94]. Key figures like Noam Chomsky, Ulric Neisser, and Jerome Bruner paved the way for understanding human cognition. "Pioneers Alan turning, Alonzo Church, Stephen Kleene, and Kurt Godel laid the groundwork for computability theory, exploring the limits and possibilities of mechanical computation"[95]. Their work established the theoretical foundations for machine intelligence. The intersection of these two intellectual currents gave rise to AI: Cognitive revolution that is, understanding human thought processes and mental states and computability theory which refers to developing machines capable of simulating human cognition. This convergence sparked innovative ideas:

i. Machine simulation of human thought (could machines replicate human problem-solving and decision-making?)
ii. Intelligence as computation (could intelligence be reduced to computational processes?)
iii. Cognitive Architectures (Designing computational models of human theory has driven AI research, influencing AI, cognitive science, and computational modelling. The convergence of cognitive revolution and computability theory has shaped the course of AI, forging a rich intellectual heritage that continues to inspire innovation.

[93] Descartes, R. The World and Treatise on Man. Edited by Collingham, J., R. Stoothoff & D. Murdoch, (2014: Cambridge UniversityPress), P. 79.
[94] Peter N. "The Legacy of the Dartmouth Conference", Communications of the ACM, 63(10), (2020).
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Block's Critique of Machine Functionality

Block's critique of machine functionality primarily discusses the limitations of functionalism in comprehending mental states and consciousness. His arguments challenge the notion that machines, especially those employing artificial intelligence, can be said to "think" or "comprehend" in the same way humans do. Block's critique together with the critique of Hubert Dreyfus and Searle's Chinese room were the three philosophical criticisms of strong AI that helped to change the tide in the AI community and point to new research directions. Bringsjord and Arkoudas commenting on this state that "there had been several other philosophical criticisms of strong AI before these such as Lucas and Penrose but these three generated the most debate and have the greatest impact"[96]. However, before we discuss in details Block's critique, let us briefly analyze the critiques of Dreyfus and Searle.

Hubert Dreyfus's seminal critique of AI combines empirical and philosophical arguments, challenging the feasibility and theoretical foundations of AI research. Dreyfus's empirical critique focuses on AI researcher's inability to create general purpose intelligent systems, despite initial optimism and grandiose forecasts. This criticism was largely dismissed firstly as invalid. This is because AI was a young field, and breakthroughs couldn't be expected immediately. Second, on the ground of being unfair. This was anchored on the basis that early pioneers' enthusiasm didn't necessarily reflect the field's potential. However, Dreyfus argues that "AI is rooted in a flawed rationalist tradition, dating back to Leibniz and Hobbes. This programme posits that human understanding relies on forming and manipulating symbolic representations"[97]. Dreyfus contests this view asserting that (i) "humane understanding is non-declarative, skill-based know-how. (ii) Intelligence is inarticulate, preconceptual, and phenomenological. (iii) Human cognition cannot be reduced to rule-based systems"[98]. Dreyfus highlights several capabilities and phenomena that resists computational treatment such as imagination, ambiguity tolerance, metaphor use, fringe consciousness and gestalt perception. He emphasizes the importance of relevance, arguing that "humans effortlessly distinguish essential from inessential information and draw upon relevant experiences[99]. He considers this "holistic context" problem a significant stumbling block for AI. His critique remains influential, with the problem of relevance persisting as a key technical challenge to strong AI (human-level intelligence), weak AI (narrow task-oriented, systems, and computational cognitive science. His critique encourages researchers to rethink the theoretical foundations of AI, in corporate embodied cognition and phenomenology, address the holistic context problem and develop more nuance understanding of human intelligence.

[96] Bringsjord, S. & K. Arkoudas, "The Philosophical Foundations of Artificial Intelligence". (Oct. 25, 2007), P. 13. (ibid)

[97] Dreyfus, H. L. *What Computers can't Do: A Critique of Artificial Intelligence*. (1992: MIT Press), 219.
[98] Dreyfus, H. L. *What Computers can't Do: A Critique of Artificial Intelligence*. Ibid.

[99] Dreyfus, H. L. *What Computers can't Do: A Critique of Artificial Intelligence*. Ibid.

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John Searle's Chinese room argument is another philosophical challenge to strong AI. Searle's argument is a thought-provoking critique of strong Artificial intelligence. This philosophical attack has sparked intense date and controversy. The thought experiment runs thus: "imagine Searle inside a room, where native Chinese speakers outside the room send cards with Chinese questions through a slot. Searle, fluent in English but not Chinese, uses a rulebook (lookup table) to produce Chinese responses. "The rulebook associates Chinese input with Chinese output, allowing Searle to generate responses"[100]. Searle's argument focuses on the distinction between syntax (the formal rules governing symbol manipulation e.g. computer programmes) and semantics (the meaning associated with symbols and their relationships). However, it must be noted that Searle doesn't understand Chinese. He processes symbols without comprehending their meaning. Moreso, rulebook is syntactical. It provides formal rules for symbol manipulation, lacking semantic content. And room as a whole doesn't understand, that is, the system (room, rulebook, and Searle) doesn't posses genuine understanding. Consequently, Searle argues that "syntax is not sufficient for semantics, computer programs are syntactically defined, and minds possess mental contents"[101] – human minds have semantic content, enabling understanding. This implies that no computer programme alone can provide a system with a mind and programs are not minds, and cannot suffice for having minds. Searle's argument did not end without criticisms such as system reply, robot reply and connectionist reply. These criticisms never went without counter arguments. At this point, let us delve into our main discussion.

Ned Block's seminal critique sparks a profound philosophical exploration into the essence of consciousness and the ethics of attributing mental states to machines. As AI technology accelerates, discerning the boundaries between human cognition and machine functionality becomes paramount. Let's dive into the thought experiment involving China's population and neuron firing patterns. "Imagine each person in China sending signals to others in the same pattern as Chairman Mao Zedong's brain activity on his 60th birthday. During those four hours, Mao felt pleased and then developed a headache. The question is whether the entire nation would experience the same mental states – pleasure followed by a headache"[102].

This thought experiment challenges functionalist theories, which suggest that mental states arise from functional relations among neurons. "If these relations can be replicated by China's population, does that mean the entire nation would be in the same mental state? It seems prepositions, yet functionalists might be committed to this idea"[103]. However, there are concerns that any functional relation can be emulated, making it inadequate to capture mentality. This highlights the complexity of understanding consciousness and mental states.

[100] Searle, J. R. "Is the Brain's Mind a Computer Program? *Scientific American Journal*, 262(1), (1990), 26 -31.
[101] Preston, J. & M. Bishop. *Views into the Chinese Room*. (2002: Oxford University Press), P. 58.
[102] Block, N. "Troubles with Functionalism", *Minnesota Studies in the Philosophy of Science*, 9(1978), 261 -325.
[103] Livingston, R. "Functionalism and Logical Analysis" in N, Offenberg (ed.), *The Routledge Handbook of Philosophy of Logical Analysis* (Routledge: 2022), P. 43.

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Block further argued on absent qualia which challenges functionalism, questioning whether mental states can be reduced to functional roles. This notwithstanding, recent advancements in neuroscience and chaos theory undermine the argument's assumptions.

Block posits that "functionalism fails to account for qualitative mental states (qualia)"[104]. He uses a thought experiment involving a homunculi – headed system to demonstrate that functional equivalence does not guarantee mental equivalence. Thus, he argues that:

i. Machine functionalism equates mental states with machine table states.
ii. The homunculi – headed system lacks qualia, despite functional equivalence.
iii. This casts doubt on the identity of qualitative states and machine table states.
iv. Consequently, functionalism's validity is questioned[105].

His thought experiment involves: a control center with a bulletin board, lights, and buttons. Homunculi implementing machine-table instructions. The system performs like a normal person.

Machine functionalism posits that mental states arise from functional relationships between components, rather than their internal constitution. However, the Chinese Room thought experiment reveals a troubling consequence of this theory. If the Chinese simulated the correct transition table, faithfully replicating the brain's functional relationships, they would supposedly constitute a conscious mind. This conclusion strikes us as absurd, as the simulated system backs subjective experience, sensations, pains, itches, beliefs, and desires. Although the Chinese system might be isomorphic to the brain at some level, it fails to harbour genuine mental states. This underscores the limitation of functionalism's focus on structural relationships. Similarly, purely computational AI systems would not possess genuine minds, despite potentially mimicking human-like behaviour. This challenges the notion that AI can truly think or experience consciousness. Some functionalists argue that our intuitive rejection of the China brain's mentality stems from "brain chauvinism" – an unjustified bias toward neurological systems. However, this perspective is difficult to accept.

The Chinese Room thought experiment has convinced many that unalloyed functionalism is overly permissive and must be either abandoned in favour of alternative theories or significantly revised to account for the missing elements of mental experience.

Conclusion

Block's philosophical arguments prompt a profound re-examination of intricate relationship between consciousness and physical systems. His critique underscores the urgency of addressing fundamental questions regarding the criteria for consciousness, mental state attribution and

[104] Campisi, et al. "EEG Non-Linear Features", *Journal of Neuroscience Methods*, 219(1), (2013).

[105] Livingston, P. "Functionalism, Logical Analysis, and the Nature of Thought", *Syntheses*, 193(10), (2016), 3051 – 3072.

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understanding machine intelligence. His seminal critique of functionalism has profound consequences for the ethical considerations surrounding AI. By challenging the notion of machine consciousness, Block's argument raises essential questions about the moral status of AI systems and the ethical frameworks guiding their design and use. His critique prompts a reassessment of the ethical frameworks applied to AI such as revisiting the Turing Test, rethinking the "mind" in mind uploading, and human-centred ethics. His arguments also underscore the limitations of solely focusing on functional output in cognitive science, highlighting the crucial role of subjective experiences in mental states. This paradigm-shifting perspective emphasizes the necessity for a more holistic and integrated approach to understanding consciousness.

Finally, Block's seminal critique of machine functionality offers a profound philosophical framework for scrutinizing the constraints of functionalism and the elusive nature of consciousness. By highlighting the pivotal role of qualitative experiences and distinguishing between functional proficiency and authentic comprehension, Block's arguments significantly enhance, the ongoing discourse in AI and cognitive science. His critique boldly confronts prevailing assumptions regarding machine consciousness, resulting to essential debates on the limits of functionalism, consciousness and qualia, and authentic understanding. By reframing the discussion on machine functionality and consciousness, his view propels us towards a deeper understanding of human intelligence, the complexities of consciousness, and the ethical responsibilities of creating intelligence systems.

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