Brian Sowers

10/27/2023

Artificial Intelligence and Machine Learning

1. Describe the relationships between Big Data, AI and Machine Learning

Artificial Intelligence (AI) can be defined as "software that gains self-awareness and possesses the ability to make thoughtful decisions by harnessing the power of big data analytics" (Secure Business Operations Module 1, 7). Big Data, in this context, refers to the vast quantities of data that would otherwise require an immense number of man-hours to identify consumer usage patterns.

Machine Learning is a key component of AI and operates on the principle that machines can learn and perform tasks with minimal human intervention (Secure Business Operations Module 1, 23). These three elements—AI, Big Data, and Machine Learning—are intricately interwoven to enhance automation. They enable tasks that would traditionally demand significant human effort to be completed in a fraction of the time. A case in point is the application of AI, Machine Learning, and Big Data analytics in quantitative trading. Trading algorithms have become self-adjusting, eliminating the need for continuous human intervention while continually striving for optimal results. AI is also revolutionizing the management of investment portfolios.

The advantages of AI in this context include enhanced risk and opportunity analysis, real-time monitoring, data-driven recommendations, sophisticated models, and predictive analytics (AI Predictions, 1). When we consider the combined impact of Big Data, AI, and Machine

Learning, it's evident that these technologies are not poised to replace human jobs, but rather to enhance our capabilities and improve the way we work (*AI Predictions*).

2. Explain the core differences between Strong AI and Weak AI. How could strong AI pose a future security threat?

Artificial Intelligence (AI) is commonly classified into two categories: Strong AI and Weak AI. Weak AI is characterized by its confinement to the predefined rules it is programmed with. It lacks the capacity to operate beyond these rules and is best suited for performing specific, narrowly defined tasks. An example of Weak AI is Siri. In other words, Weak AI's "intelligence is limited to solving problems that the system has been programmed for; anything beyond its programmed scope is beyond its capabilities" (Ariwala, 1).

On the other hand, Strong AI is considerably more advanced and exhibits human-like behavior. It can be programmed to understand and exhibit emotions, reasoning, and belief systems. A fundamental distinction between the two lies in the fact that "Weak AI does not encompass full intelligence; instead, it concentrates on completing specific tasks it is assigned, while it is far more challenging to set limits on the intelligence of Strong AI" (Ariwala, 1).

The theoretical point at which AI matches the cognitive capacity of the human mind is referred to as the "singularity." There are hypothetical concerns that once AI reaches this point, it could pose risks to human civilization with "unforeseeable consequences" (What is Machine Learning, 1). However, the more immediate concern is the practical implications of AI attacks. If Strong AI were to utilize its continuous learning capabilities, AI attacks could have devastating consequences. Such attacks have the potential to impact all sectors and technology platforms, as

AI can adapt to its environment and learn defensive strategies (Secure Business Operations Module 1, 20).

Works Cited

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