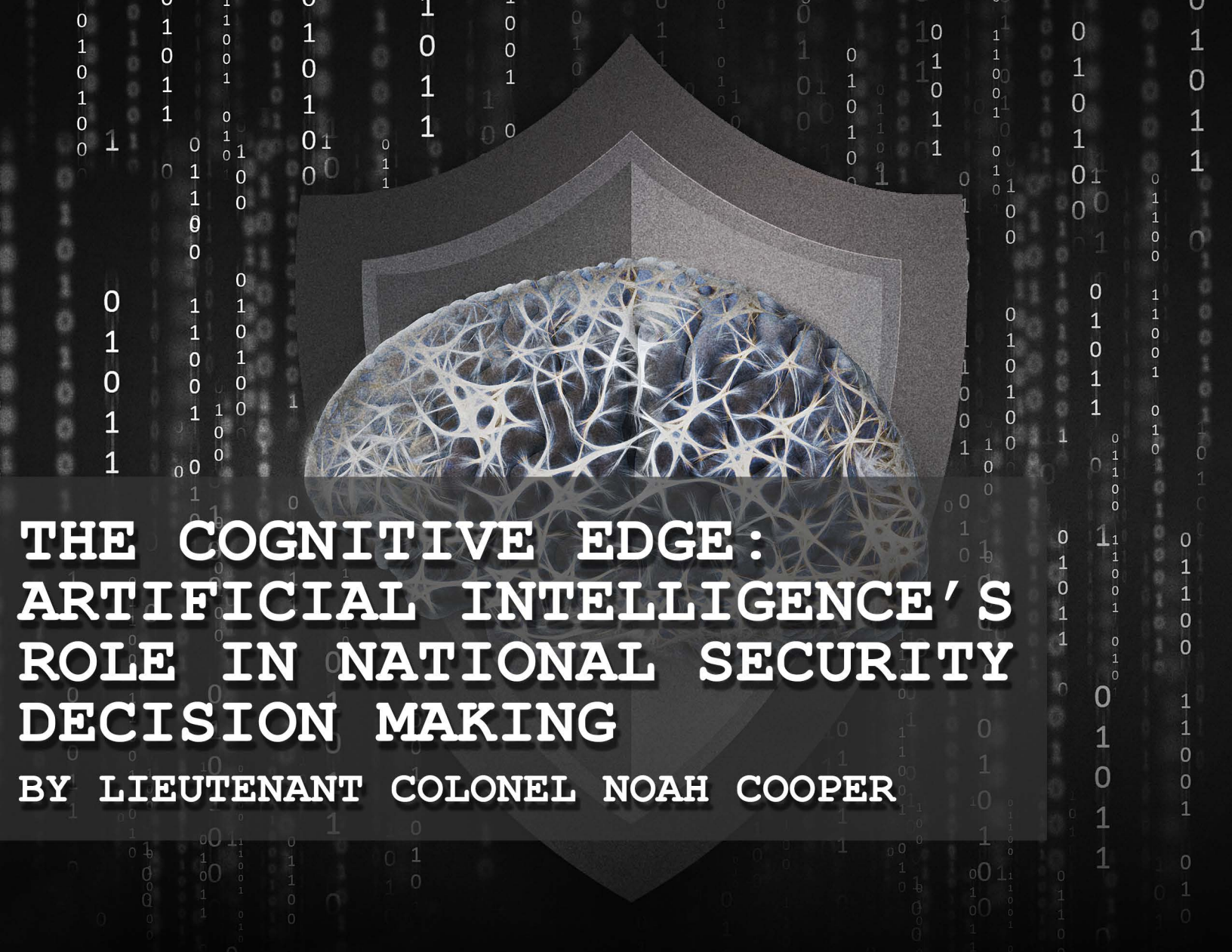




THE COGNITIVE EDGE: ARTIFICIAL INTELLIGENCE'S ROLE IN NATIONAL SECURITY DECISION MAKING

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Decision making in the context of national security occurs amidst uncertainty, ambiguous information, time and resource constraints, and other dynamics that create an admixture of variables, which, combined, impose immense pressure on those with decision-making authority. Navigating the complex factors involved in resolving an evolving and potentially escalating crisis demands a careful balance of short- and long-term strategies to counter a competitor with clear malicious intentions. Furthermore, it is essential to assess whether existing policy approaches have failed, which could prompt the difficult consideration of armed conflict to secure a more advantageous security posture. These challenges profoundly test the limits of human cognition. Decision makers employ a combination of the advice provided by subordinates, the counsel given by seasoned experts, and their own intuition to guide their thought processes to seek optimal solutions to issues under consideration. Complicating this is the requirement to contend with multiple time-constrained, rapidly evolving scenarios, which are emblematic of today's national security landscape.

To cope with these challenges inherent to guiding national security outcomes, artificial intelligence (AI) could serve as an ideal adjunct to the decision-making process. Specifically, AI could augment and overcome the limitations of human cognition in three ways: first, by providing real-time decision support through the timely analysis of the myriad data points that feed such decisions, second, through the simulation and modeling of scenarios to present alternative perspectives and outcomes or to anticipate responses, and, third, to combat the negative implications associated with cognitive biases. Accordingly, in examining AI's role in enhancing decision support, it is worthwhile to understand the impact of this emerging technology.

The Limits of the Mind

Before explaining the utility of AI support to national security decision making, it is important to understand how the human mind processes data and its associated limitations. The interaction of biological, psychological, environmental, and social factors affects how humans perceive, process, and

respond to information. The influence of each of these factors varies, corresponding to an additional set of variables, including time, age, attention, and memory limitations. Understanding the totality of human cognition is beyond the scope of this article; however, it is valuable to note that despite the impressive ability of humans to intake and analyze data, the human mind remains a fallible tool, impacted by cognitive biases, challenges associated with processing information, and the ever-present emotional influences that skew rationality and lead to impulsive decisions.

“Cognitive biases are mental errors caused by our simplified information processing strategies.”¹ Simply stated, cognitive biases are mental shortcuts or patterns that lead to errors in reasoning or judgment. A common example of a cognitive bias is confirmation bias, which involves seeking information that supports a pre-existing idea or belief. For example, a stark instance of confirmation bias that negatively affected national security decision making occurred before the 1941 Japanese attack on Pearl Harbor. Decision makers in the United States believed Japan was more likely to attack targets in the Southwest Pacific to secure natural resources.² As a result, the United States downplayed evidence that Japan was planning a surprise attack on Hawaii as the information did not conform to expectations. Historical vignettes like this illustrate the importance of thinking critically and questioning established assumptions. Failure to do so in the context of defense and national security could yield deadly consequences.

Mental models or biases are dangerous for a variety of reasons: they can distort the understanding of a situation by altering how individuals process information, undermine objective decision making, prompt faulty assessments and thus increase risks, and, perhaps most applicable to national security decision making, compound errors through the unintentional rejection of relevant data or through the misjudgment of an actor’s ability to influence a situation. There are many approaches to mitigating the impacts of cognitive biases, such as using critical thinking frameworks, employing decision-making tools, and implementing technology solutions. Most importantly, awareness, recognition, and contending with cognitive biases are crucial to effective decision making, particularly in the high-stakes realm of national security.

Information Processing

Humans process data through a combination of sensory, cognitive, perceptual, attention, and other mental frameworks that directly shape cognition and decision making.³ Understanding how humans process information serves to identify the strengths and limitations of cognition, which contributes to more effective and positive decision-making outcomes. Every second, sensory inputs bombard the human mind with environmental stimuli. Fundamentally, the brain categorizes these stimuli into relevant and irrelevant

data or, simply, information required for safety and survival and that which is not necessary. Unnecessary information is discarded. The mind then encodes and stores important information in short-term or long-term memory for recognition or retrieval.⁴ This information is then used for processing and decision making. Through this interconnected cycle, humans receive, optimize, and process information based on the unique circumstances encountered.

Though highly sophisticated, human information processing is not without drawbacks. First, humans have a limited working memory capacity, which can result in information overload when contending with complexity.⁵ Second, compared to the processing speed of information technology systems, human cognition is relatively sluggish, which can slow the overall decision-making process. Finally, human cognitive performance declines with fatigue, which can impair decision making.

The role and impact of emotions in decision making are multifaceted. Emotions have the propensity to shape human choices, either positively or detrimentally. Optimism and confidence grounded in objectivity and realism can encourage creative thought and the exploration of alternative approaches to a problem. At the same time, impulsivity and irrationality can prompt a decision maker to myopically focus on a singular outcome that does not seek an optimal resolution. Since they are often made rapidly, emotional decisions may not conform to long-term goals.⁶ This condition of emotional decision making illustrates the importance of understanding the psychology of one’s decision making to make more rational and informed choices.

Artificial Intelligence as an Aid

The recent rapid advances in AI technology will likely offer significant potential to aid national security decision making. Fully overcoming the limitations of human cognition is not a feasible prospect; however, implementing measures to mitigate some of the negative impact is reasonable and necessary, particularly in the fast-paced arena of national security, where an incorrect or off-base decision can have cascading effects. Given this importance, it is imperative to employ structured frameworks to overcome the impact of cognitive biases, to consider and attempt to regulate one’s emotional state before proposing a decision that could yield significant consequences, and to understand the limitations of human information processing. AI can complement these practices by enhancing data analysis, by modeling realistic scenarios that gauge responses to security challenges, and by moderating the influence of cognitive biases and human emotions through the provision of data-driven and objective analysis.

The requirements to balance competing interests, mitigate risks, and contend with continuously developing and evolving crises are just some characteristics of national security

decision making. For each of these concerns, decision makers encounter an overwhelming volume of data from many sources, including intelligence and diplomatic reports, social media, imagery, and advice from subordinates and colleagues. Ideally, the information provided to a decision maker results from a structured, orderly process involving multiple layers of quality assurance and review to ensure timely and responsive delivery. However, the dynamics of the global security environment and the need to contend with information from multiple sources generate interpretation and analytical challenges for the decision maker. AI is an ideal means to provide structured analysis to enable data-intensive national security decision making. AI's capability to synthesize multiple data points and identify patterns in large data sets is an effective means of data analysis to determine threat indications. Additionally, AI's rapid or real-time data processing capability can specify the primary catalyst of an issue, making deliberations more efficient for decision makers.

AI is most notable for its computational and data analytics capabilities. However, it also offers unique modeling and simulation functions that can help national security decision makers overcome ambiguity and complexity to make informed and effective decisions. Using historical data, AI could quickly create vignettes based on user input to determine the most favorable response to a given scenario. For instance, an AI algorithm trained on game theory could explore interactions between peer adversaries competing just below the threshold of armed conflict, or in a situation where responses are not always scripted or anticipated. In cases where pre-planned responses exist, AI could test the viability and the feasibility of interactions and adapt them to new circumstances and facts on the ground while simultaneously determining their success potential. Moreover, given the complexity of the global security environment, conflicts involving only two actors are rare; decision makers must consider multiple economic, diplomatic, and military interdependencies among numerous actors. An AI-powered modeling and simulation capability could aid in exploring the implications of these various factors and their ramifications for each actor. These capabilities represent just a sampling of the potential modeling and simulation prospects of AI.⁷ Other potential modeling and simulation uses could include support to military operations through the evaluation and testing of operational plans, the development of real-time visualizations to depict and represent ongoing events and crises, and depictions that explore actions in multiple domains.

Perhaps AI's most integral function is its potential to mitigate the deleterious impact of cognitive biases and thus improve human decision making. The human mind is prone to unintentional errors and subjectivity and tends to favor preconceived ideas that support an individual's beliefs. Overcoming

these issues, particularly in a time-constrained decision-making cycle, is not just challenging but close to impossible. The Prussian military philosopher Carl von Clausewitz spoke of the *coup d'œil*, or the "inward eye" that enables a battlefield commander to see "a truth that the mind would ordinarily miss or would perceive only after long study and reflection."⁸ It is difficult to challenge Clausewitz's assertion that successful military commanders possess an intrinsic genius that allows them to make quick yet informed decisions, which could potentially alter the outcome of a battle. However, our understanding of human cognition has advanced considerably since his time and has not fully reinforced the natural *coup d'œil*; instead, it has revealed the contradictory mechanisms that subconsciously skew human perception and understanding of the environment. A deeper understanding of human thought necessitates implementing measures to overcome the problems posed by cognitive biases and mental models.

AI can aid in tempering these issues by invoking increased impartiality and the rigor necessary to counteract the impact of such biases. Through a data-driven approach, AI can offer objective, emotionally disconnected recommendations that correspond to recognized norms and practices. When appropriately trained, AI could employ structured analytical techniques such as red-teaming, analysis of competing hypotheses, alternative futures analysis, and other approaches to provide a decision maker with unbiased decision recommendations, validated by stringent data analysis and analytical methodologies.⁹ It is important to note a potentially significant fault with AI, however: the risk that training data used to develop the AI algorithm could contain information already flawed by bias, inaccuracies, or falsehoods. Despite AI's data analysis advantages, decision makers should, therefore, be measured and cautious about incorporating such data until a means is in place to extricate any pre-existing bias.

Conclusion

The advances in artificial intelligence offer a unique capability to manage the challenges inherent to national security decision making. With its ability to handle vast amounts of data, AI is a tool that can integrate information from multiple sources into digestible and easily comprehensible visualizations at a rate that far surpasses human analysts. AI modeling and simulation offer a rapid means to assess and forecast the impacts of national security decisions, which could identify possible unintended outcomes. Perhaps most importantly, AI can serve as a vital tool to mitigate the consequences of cognitive biases. AI can process data systematically and free from the biases introduced by human cognition. This technology offers a means to moderate the impact of emotionally charged decision making by providing objectively synthesized information, free from human emotional influence.

Given the advantages of leveraging AI in national security decision making, we must address the inevitable question: Does the automated analysis of current or potential events and crises render human judgment unnecessary? Though human cognition cannot compete with the data processing power of AI systems, the need for human judgment in national security decision making remains fundamentally unaltered.¹⁰ AI is unlikely to develop or exhibit the creativity or ingenuity intrinsic to the human mind, especially when contending with highly complex and delicate national security issues. At the same time, however, humans cannot contend with the influx of multiple data flows and will exhibit cognitive fatigue over time. Individually, AI and humans are both fallible; however, integrating decision making between man and machine allows for the distillation of data into easily discernible components while preserving the originality and vision that would enable human decision makers to think more effectively and thus to produce significantly more accurate national security decisions. ✨

Endnotes

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