



Exploring Decision Advantages

Improving Speed, Precision and Efficiency in Military Targeting by
Applying Artificial Intelligence

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Doctoral Thesis

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Abstract

This dissertation investigates the integration of artificial intelligence (AI) to augment critical decision-making in military targeting processes, offering a significant empirical contribution to applied research in War Studies. Grounded in Boyd's OODA loop theory (Observe, Orient, Decide, Act), the study examines how AI can enhance the speed, precision, and adaptability of joint targeting in dynamic and complex environments.

Two AI models are developed to address distinct challenges in contemporary targeting. Model 1 improves sensor allocation against medium-range surface-to-air missile systems by optimizing intelligence collection. It offers predictive analysis of adversary systems and can enable direct target engagements if validated as an independent intelligence source. Model 2 addresses multi-objective optimization of multiple targets under resource and time constraints, incorporating targeting guidance into a mathematically robust framework. It supports all OODA loop stages, synchronizing attack options to achieve desired effects.

The findings demonstrate that AI augmentation can significantly expand the decision space for military commanders and offers more opportunities to rapidly exploit, adapt and take the initiative with a greater variety of options. The integration of AI facilitates the transition from hierarchical and linear targeting structures to more dynamic and non-linear concepts and enhances organizational adaptability and effectiveness under dynamic targeting conditions. This research underscores AI's transformative potential in military operations, enhancing adaptability and organizational effectiveness under modern warfare conditions. Recommendations highlight AI integration as a strategic priority and encourage further exploration of its ethical implications, impacts on command authority, and long-term effects on warfare dynamics.

Keywords: Artificial Intelligence, Military Targeting, Decision-Making, OODA Loop, Intelligent Agent, Joint Targeting Process, Optimization.