

Thesis Project Portfolio

Optimizing Demand Forecasting in Supply Chain Management With Artificial Intelligence
(Technical Report)

An Examination of Artificial Intelligence in Modern Warfare and Conflict Resolution
(STS Research Paper)

An Undergraduate Thesis
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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

My technical report and STS research paper explore two distinct, yet conceptually intertwined domains of artificial intelligence (AI): the former being industrial supply chain management, and the latter being military geopolitics. As AI technologies continue to accelerate and permeate the global environment, these projects, albeit widely differing in subject matter, underscore the profound, multifaceted influence AI has on shaping human structures—from commercial forecasting workflows to international power dynamics. Nonetheless, while this synthesis serves to summarize my projects, it, more importantly, reflects our collective responsibility as a society to fully assess and understand how AI-driven systems are revolutionizing current technological norms and processes and simultaneously embedding unique social, political, and ethical values into their designs and deployments.

My technical report documents my internship experience at o9 Solutions, where I worked on a project aimed at enhancing the general reasonability of the company's demand forecasts, which, at the time, were often unreliable and required manual corrections. Given these issues, I opted to redesign the legacy demand forecasting system by developing an AI-enhanced input checks workflow. Specifically, I implemented a classification-based pipeline to better distinguish between recurring and random anomalies present in historical sales data, and leveraged separate time-series features and ML models to programmatically link any recurring anomalies to their associated demand drivers and correct any random anomalies. In the end, these technical contributions significantly improved the accuracy of forecasting projections and reduced the manual burden on demand planners in many client scenarios, thus demonstrating AI's potential to streamline these operations through intelligent, efficient data preparation.

My STS research paper also captures the transformative capabilities of AI, only, in this case, focusing on its role in modern warfare. Centered around the ongoing Russia-Ukraine conflict, my analysis employs Langdon Winner's Technological Politics framework to examine how AI is more than just an augmentative tool in strife, and, instead, functions as a deeply political actor. Through the review of specific weapons and logistics entities, disinformation campaigns, and humanitarian technologies, my paper outlines and substantiates this claim of AI systems being designed and deployed to serve deliberate ideological objectives, citing how both Russia and Ukraine are using AI to not only enhance their respective battlefield powers, but also redefine combatant roles and networks, control external narratives, and subjugate populations. In doing so, my research illustrates that AI is actively reshaping contemporary notions of war, sovereignty, and accountability, which makes the development of robust international strategies that account for its social and legal ramifications paramount.

Although I completed these projects at different times, working on both has still allowed me to appreciate the expansive scope of AI's impact across different niches. Indeed, my technical work deepened my understanding of AI as a potent tool for decision-making and process optimization. On the other hand, my STS research prompted a critical reflection on its extending repercussions outside of commercial contexts, ultimately instilling within me a sharpened awareness of the vast ethical responsibilities engineers must uphold when designing structures that shape human behaviors and institutional procedures. Moving forward, I will carry this perspective into my future technical endeavors, ensuring that, beyond the mere functionality of my work, I always consider the broader implications that innately and inevitably accompany technological innovation.