Enemy Location Prediction in Naval Combat Using Deep Learning

(Technical Report)

Socio-Technical Effects of Artificial Intelligence Systems Within the Navy

(STS Research Paper)

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The United States military is constantly looking for ways to develop new technology which will allow them to stay ahead of the curve and effectively project power across the globe. For the Navy, the use of automation and artificial intelligence can do just this by giving sailors a better understanding of the environment in which they operate. Using supervised machine learning techniques to predict ship characteristics, or to find hidden ships based on the locations of observed contacts puts more knowledge in the hands of ship drivers and allows them to make informed decisions. Automation and artificial intelligence are complex and often misunderstood technologies, and studying the way human users interact with them is important as it can lead to the design and implementation of better systems. The environments that the Navy operates in are sometimes high-stress, fast-moving, and unforgiving places where accidents can cause heavy consequences. Understand how a technology will work when placed in its intended social and technical conditions can increase effectiveness and lessen the chance of accidents, thereby saving the Navy time, money, and the lives of its sailors. In this paper, I use the Interactive Socio-Technical Analysis framework to study how the implementation of automated technologies like the Patriot Missile System and the Integrated Bridge Navigation System led to unintended consequences due to the nature of their interactions with the established social and technical systems into which they entered. By analyzing these case studies using consequential analysis, I aim to show how poor understanding of automation and artificial intelligence—from high-level leaders to

the actual system users—can negatively affect their use and lead to unintended consequences. Finally, I will explain how to avoid these consequences based on the nature of the research findings For the Navy to have a technical advantage over its near-peer competitors, it needs to embrace new technologies that improve mission effectiveness. Automation and artificial intelligence promise to provide all sorts of tactical and administrative advantages, but only if they are designed, administered, and utilized properly within their area of operation.