Thesis Project Portfolio

Self-Correcting Ping Pong Ball Launcher

(Technical Report)

Ethics in Robotics: Being More Mindful as Engineers

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

With recent rapid developments in intelligent technology such as artificial intelligence (AI), important issues regarding the ethical creation, use, and handling of these technologies have been a hot topic not just in academia, but in larger society as well. Fears of automation or AI replacing jobs is a genuine concern, especially when considering the near-complete lack of regulation or legislation by government entities around the globe. My capstone research hoped to address these problems by being an outstanding technology which did not violate any of these principles. The Ping-Pong Launching Robot, finished in fall of 2022, was created with the ideas of sustainability and inability for misuse in mind. From the harmless intended use case of playing games involving the launching of ball projectiles to the disassociation of data collection, my capstone research project tackled the problem of ethics in robots by example. The problems this technology looks to face are not statistically quantifiable or even directly tangible in many cases. This means being more aware as creators and users of these technologies and their ethical uses in society is truly the best method of mitigating the negative outcomes these problems could bring.

As a set of social, political, and philosophical problems, the field of STS has multiple theories that apply in various ways. The idea of technological momentum, as well as the related social construction of technology (SCOT) directly apply to a problem relating society and technology. The cause-and-effect nature of the problem also sees Actor-Network Theory (ANT) as a method of analysis. While a combination of these is employed in my STS research, a large emphasis is placed on the usage of ANT to highlight direct links between problems and solutions or technology and outcomes. And while there is not a quantifiable outcome to the research, the recognition of the possible devastating consequences and the current minimal regulation will hopefully showcase that ethics in robotics and other intelligent machines is a genuine concern.

My capstone project and STS research are directly related to one another – making them easy to frame within the context of the problem. With technology accelerating towards a convergence point with ever-increasing impact, preventing catastrophic failures starts at the ethical level. Using recycled or sustainable materials to keep a low-carbon footprint, making sure data and user information is kept private, and preventing misuse in ways that could cause harm; these are the commonalities between my capstone research and STS research that other technologies should look to incorporate for a better future.