

Thesis Portfolio

Building and Applying the Internet of Wasted Things: SCRAP and Periop Green
(Technical Report)

**A Socio-technical Analysis on the Role and Implications of Climate-AI Technology in the
U.S. and India**
(STS Research Paper)

An Undergraduate Thesis

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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

This thesis dives deep into the budding relationship between artificial intelligence (AI) technology and climate change. The severity of the climate change threat to the planet and humanity becomes more apparent each day. Tackling such a global, multi-faceted, and complex issue is no small task; it will require a variety of solutions of equal breadth and scale. One aspect of that solution space is artificial intelligence. AI is already becoming an ever more common component of digital technologies; its power is at once both fantastic and terrifying. However, it is a technology that is here to stay, and due to its capacity for massive data analysis that exceeds human capabilities, AI has the potential to provide uniquely-suited remedies to aid the planet.

The technical project is an example of one of those AI-based solutions spaces for climate change. The project spans several years of effort into building the Internet of Wasted Things (IoWT). The first application we explore is SCRAP, a computer vision-based model to detect, sort, and mitigate recyclable waste. Secondly, we tackle the Periop Green project, which seeks to use computer vision to detect and reduce single-use sterile surgical supplies in hospital operating rooms. Both projects are focused on mitigating material waste, an important and challenging aspect of tackling climate change.

The STS portion takes a wider look at the role and implications of AI-climate technology with a specific focus on the United States and India. It is a socio-technical analysis on how the sociotechnical systems in each country influence and are influenced by the direction of climate-fighting technology. Both countries are major players in the game regarding artificial intelligence and climate change, and additionally have a new partnership alliance announced on Earth Day 2021 to tackle the climate crisis together.