

Thesis Project Portfolio

Adaptive Mobile Sensing: Leveraging Machine Learning for Efficient Human Behavior Modeling

(Technical Report)

An Actor Network Theory Approach to Analyze Sociotechnical Systems Operating to Reduce Ocean Plastic Pollution

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Spring, 2020

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Effects of Ocean Plastic Pollution on Society and the Environment and Potential Solutions

Sociotechnical Synthesis

The topic I observed in my research was the effects and proposed solutions to ocean plastic pollution. While this topic was not closely related to my project, I chose this problem because it is something that I am passionate about, as well as a topic in which I had done much previous research on. This topic has large scale implications on society, and there are several complex strategies involving technical dimensions which could be observed towards resolving the issue. My thesis project observed the effects of ocean plastic pollution on the environment, society, and economy, while my research project observed an actor network to analyze the implications of sociotechnical transitions operating to reduce ocean plastic pollution. By utilizing the sociotechnical framework of actor network theory, my research provided insight on the costs and consequences of this issue, as well as the effectiveness, feasibility, and implications of different potential resolution strategies.

More specifically, the objective behind my thesis is not to raise awareness of the issue, rather, it is to enhance comprehension of the issue. This is an attempt to take a broad, large scale topic, and help enable the ability of the reader to understand the global consequences of the current state, as well as the feasibility of a set of proposed solutions which might be effective at resolving the issue. The motivation behind this is topic is to fuel innovative thought regarding whether or not this issue can be resolved, and if so, which strategies or combinations of implementations will be effective at solving this problem on a global scale.

The technical portion of my research expanded on the elaborated context of my thesis. This research was conducted and reported with the objective of observing the role of actor networks in catalyzing sociotechnical transitions. Expanding from the briefly discovered proposed solutions from my thesis, as well as observing smaller scale case studies operating

under a more local objective, allowed for the construction of an exhaustive actor network operating under the global scale objective. The actor network is constructed by observing institutions within defined regions, which is used to determine interactions between institutions or countries, which is used to generate inferences, and provide insight on the role of sociotechnical transitions in resolving global scale issues.

The work conducted from my thesis topic was imperative to construction of the actor network developed in my research. The first portion was simply observing the issue, and highlighting the significance of addressing the problem by determining the costs and consequences on the environment, society, and economy. This enhances the research conducted in my technical portion, as it allows for a concrete comprehension of the motivation behind construction of my actor network, as well as the implications of the insight and inferences generated by describing the effects of interactions within this global network. The most important thing I learned throughout this creative process is how sociotechnical transitions have the ability to solve large scale problems. Another thing I learned was how these sociotechnical transitions must be catalyzed using underlying moral principles within institutions which may already exist, or which must be generated by a separate process. If I were to advise the rising fourth years as to how to approach their research, I would tell them to choose a topic in which they are also passionate about, as well as utilizing their current resources and knowledge which will enhance your ability to construct something tangible, which may be of value on a larger scale.