Thesis Project Portfolio

Robottoman

(Technical Report)

Sociotechnical Imaginaries and Autonomous Vehicles in Charlottesville

(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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Sociotechnical Synthesis

Autonomous and robotic systems show potential in various facets of our daily lives. From driverless vehicles to manufacturing, there is a growing desire to have monotonous systems automated. My technical capstone and thesis explore the catalysts and outcomes for such systems, while exploring the ethical questions that arise. Growing up in the age of digital transformation, I know what it's like to be inspired by technology and have your life be influenced by it. There is certainly potential for advanced technologies to improve the quality of life for many in society, but there are stipulations attached: ones that require thought and consideration.

My technical thesis overviews on the process of remotely controlling furniture. In our case, we developed our system around an ottoman. The system was designed to be installable on any piece of furniture because of the modular nature of the design. There are two parts to the robot ottoman: the mobile application and the mechanical system. The mobile application was designed to control the ottoman, allowing it to move omnidirectionally which is where the mechanical design comes into play. The mechanical system is a set of specialized wheels that allows it to move in any direction. After successfully testing our prototype, my capstone team and I discussed ways that this system could be of benefit to the elderly.

My STS thesis focuses on the potential impact of autonomous vehicles in the Charlottesville region. I dive into the ethical and moral conundrums of allowing autonomous vehicles to operate freely. For instance, are we ready to blame an algorithm and machine for an accident on the road? I also take a look at the potential positive impacts, including reduction of pollution and traffic. It is still too early to tell if Perrone Robotics, the company testing the system, will be able to pull this off.

Innovation in autonomous systems should be exciting for everyone. However, there are definitely concerns as the system is further designed and tested in various environments. Given the investments and innovations by the people in the sector today, I do not see enthusiasm waning anytime soon, but we must proceed with caution and with an open mind.

Firstly, I would like to thank my capstone and STS team members: Daniel Hanson, Omid Khan, Matthew McDonnell, Steve Phan, and Zach Struble. Most importantly, I would like to thank my sisters, my Mom, and my Dad whose examples push me to do better every day.