

Thesis Project Portfolio

LANGPAD: A Multi-Language Keyboard Extension

(Technical Report)

Trust in Autonomous Vehicles: A Study on Tesla and its Community

(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

Emory Tedford Ducote

Spring, 2022

Department of Electrical and Computer Engineering

Table of Contents

Sociotechnical Synthesis

LANGPAD: A Multi-Language Keyboard Extension

Trust in Autonomous Vehicles: A Study on Tesla and its Community

Prospectus

Sociotechnical Synthesis

The increased prevalence of autonomous vehicles has sparked much conversation about the competency of such vehicles. Within the broader transportation marketplace, user's have a choice in what modes they value. Among the factors that influence this choice is trust in the technology being used. The following STS thesis will discuss how companies and users co-produce trust in the novel field of autonomous vehicles. Additionally, millions of users type in foreign languages on standard QWERTY keyboards every day. Characters such as the Spanish "á", the French "ç", and the German "ä" are all characters that do not have a reserved location on this standard keyboard layout. People typing in such languages must take alternative routes to utilize these characters such as memorizing complex character codes, remapping keyboard layouts, and even copying and pasting from internet sources. The following technical thesis will attempt to solve this problem with a multi-language keyboard extension.

In the STS thesis I set out to analyze how Tesla and its community of users have advanced the trust in the technology. The thesis was analyzed through the lens of Users and Nonusers of the technology, beginning with a description of the technology and Tesla's implementation of user-enabled operation. The risky nature of the technology was discussed through various accounts from Tesla users regarding their experience with the technology. Along with this risk comes the consequences, so various Tesla Autopilot crash accounts were discussed. Additional user accounts showed that users of Autopilot take advantage of the technology with the main goal of using mobile devices or pursuing other activities while the car drives autonomously. The level of trust these users felt in the car revealed that there is a majority that trusts the technology as much as their own driving. This fact was ratified by the community's response to crashes while using Autopilot, with most responses on forums blaming the driver of the vehicle and not the technology itself. The experiment Tesla is performing with this

technology seems to be proceeding unhindered, propelled forward by its ardent believers in their technology.

In the technical thesis I worked with a group of four of my classmates to produce a small keyboard extension device. To accomplish this, we distributed tasks among ourselves to focus on as individuals, including development of the graphical display, audio feedback, USB communication, as well as circuit board design. The development process included planning the various stages of design, beginning with a Gantt chart for planning out the entire semester. Problems encountered during the semester included supply chain shortages due to the pandemic as well as integration issues at the conclusion of the project. However, we were able to overcome these problems and at the end of the term we had created a working device. The device allowed for many special characters to be inputted by using a small LCD touchscreen that plugs into a computer via USB. The device was demoed and deemed functional by course instructors.