

Wheelchair Interface for Eye-Tracking (WIFE)

Aleksey Kats, Zachary Keuerleber, Owen Santangelo, Casey Stengel, and Jane Towery

Binghamton University, Binghamton, NY 13902, USA

Corresponding author's Email: jtowery2@binghamton.edu

Author Note: This project is funded by VehWare™ and supported by industry mentor and client representative William Howe, and faculty advisor Emrah Akyol.

Abstract: The purpose of this project is to improve upon a wheelchair prototype with speed and direction controlled using eye movements of the user. The prototype was unable to function in poor lighting conditions or without a large barrier to block out background motion. There were few zones for eye-tracking, which affects the smoothness when transitioning between different speeds and directions. A new camera and updated software with infinite eye-tracking zone capability has been integrated which allows for more precise speed control, background noise reduction, and infrared capabilities for use in low light conditions. The bulkiness of the design made it difficult to fit through doorways and elevators. Ergonomic functionality has been improved by redesigning the previous bulky camera mount, control box, and changing the layout of hardware components. These improvements have expanded the functionality of the wheelchair in different conditions and provide more safety for the user.

Keywords: Wheelchair, Eye-Tracking, Speed Control, Noise Reduction, Ergonomic Functionality