Developing a Tactile Depth Map for the Blind

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Blindness affects nearly 40 million people, a value expected to double before 2050. With a world incredibly dense with visual information, surviving and thriving can be hard, as a Visually Impaired (VI) person is 3 times more likely to be unemployed, suffer from depression, and be seriously injured. As such, the creation of devices that could give new information to someone VI could be vital. In response to this problem, a device was built to interpret a live-feed infrared depth map, and translate that to an array of Linear Resonant Actuators, that vibrate to display the distance of pixels from the user. This device was tested with a group of subjects, that were asked to navigate 3 mazes, blindfolded, then again with the device and blindfold, and again while able to see, where the time taken to navigate the maze, and success rate were recorded. Averages were then taken for each subject in both categories of measure, across all three testing conditions. Two paired T-tests were then used to analyze the difference between the blind and device tests, for time and rate of success. It was found that the improvement in time was not significantly impacted, with a P-value of 0.2821. However, the improvement rate of success was statistically significant at a P-value of 0.00001. Showing that depth information can be displayed through touch, and future improvements could allow a VI person to better interpret their world in anything from avoiding dangerous situations to successfully shaking someone's hand.

Awards Won:

Third Award of $1,000