Neo-Sole Accelerometer-Based Remote Communications Fall Detection Device

Shah, Saurabh

Brooks, Jake

The purpose of this research is to design and build an in-shoe fall detection system, as well as test the market for demand. The first phase of the project involved learning the Arduino language and designing the hardware and software. The next phase was testing the shoe for accuracy using four types of falls (forward, backward, right and left) as well as false alarm tests during normal activities (sitting, standing, and walking). The final phase involved surveying the target audience: the elderly (of age 65 or older). Survey questions included gender, age, medical conditions, whether or not the participants own a fall-detection device, and if they are interested in the N.A.R.C. A total of 49 trials were completed. The device detects 97.5% of all falls, and is not prone to many false alarms, though it did show two false warnings while walking (in 45 minutes). 20 people completed surveys, 65% of those surveyed were interested in the shoe and would use the device. Additionally, 45% of those surveyed are not currently using any fall detection device. The shoe detected almost every fall, and thus needs little to no improvement of that aspect. The number of false alarms and warnings was also acceptably low. Additionally, 78% of those who are not currently using a fall detection device were willing to use the N.A.R.C. fall detection system, showing that the target audience wants the device.

Awards Won: