Using SONAR, LIDAR, and Computer Vision to Assist the Visually-Impaired

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In 2017, the World Health Organization reported that there were 285 million visually-impaired people worldwide of which 39 million are completely blind. According World Access for the Blind, physical movement is one of the biggest challenges for blind people. Traveling or simply walking down a crowded street may be very difficult. Traditionally the only solution was using the commonly known "white cane" which is primarily used to scan surroundings by hitting the obstacles in proximity of the user. A better solution would be a device that can replace the sighted assistant by providing information about location of obstacles so that the blind person can go out in unknown environments and feel safe. During this project, a small battery-operated device that meets these criteria was developed. The device can detect the size and location of object by means of sensors which measure the position of objects in relation to the user, relay that information to a microcontroller, and then convert it to audio to provide information to the user. The device was built using available commercial LIDAR (Light Detection and Ranging), SONAR (Sound Navigation and Ranging), and computer vision technologies linked to microcontrollers and programmed to provide the required audible information output using earbuds or headphones. The detection technology was embedded within a "white cane" to indicate to others the user's condition and provide additional safety.

Awards Won:

Oracle Academy: Award of $5,000 for outstanding project in the systems software category.

Third Award of $1,000