More than a Feeling: A 3D Haptic Vest for the Visually Impaired

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The purpose of this project was to make a vest that a visually impaired or blind person could use to have an easier time moving around in their environment. The project was chosen due to interest in computer science and electronics. The hypothesis was that it is possible to make a vest that displays 3D depth data through a haptic vibration motor array. The vest would use a stereo video camera (like one from an Xbox Kinect), processors, integrated circuits, a computer, and a battery supply. The electronics other than the Kinect would be stored in a backpack. This project uses a matrix of 48 vibration motors that wraps around the torso. The vest sends tactile feedback to the user in such a way that they can perceive the environment in front of them in 3D. This is done by using varying levels of vibrations. The C# WPF Master Controller Program (MCP) collects data from the depth sensor and converts it to low resolution 3D video. That picture is sent to a communicator program which takes the information from the MCP and sends it to the propeller microprocessor through the USB cable. The Parallax Propeller program takes the low-resolution 3D video and sends it to the LED drivers in the circuit box. The LED drivers convert the depth video to vibrations of the motors in the vest. Results showed that the vest works well and requires very little time for a person to learn to use it.

Awards Won:

Third Award of $1,000