Object Recognition for the Visually Impaired: Utilization of 3D Sensor Technology to Help the Blind "See"

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Over 285 million people in the world today are visually impaired (World Health Organization). With enhancements in sensor technology and computer aided vision, tools to make the lives of these individuals easier should be possible. The purpose of this project was to determine if these technologies, coupled with depth information provided by 3D sensors could be used to recognize objects and convey their location via an auditory response to the visually impaired. To test this hypothesis, computer programming was used to process raw images from a 3D sensor and then find the presence and location of an object based on features that the processor was trained to recognize. Speech recognition was incorporated in the program to control the sensor, and an auditory response was provided to the visually impaired person. A prototype of this device was built and evaluated for effectiveness. When all the above elements were combined, the sensor was able to detect, recognize, and provide relative distance information to the object with over 90% accuracy. To test the versatility and accuracy in recognition, the device was tested with different sizes and shapes of an object placed at various distances. This technology can also be used to map out new and unfamiliar places for a visually impaired person by providing auditory information about objects present in the field of view. This project provides the platform for further research in demonstrating how technology can be used to enhance the lives of the visually impaired.

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