An Ultrasonic Sensor Based Travel Aid Glove for the Blind

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The goal of the project is to create an affordable ultrasonic sensor based travel aid glove based on “haptic feedback”. The product will greatly assists blind people in moving, using the simulation of the “listening ability” of bats by combining ultrasonic sensors with vibration motors and a simple sound system. The ATmega328, which is the main controller, receives the data collected from the sensors, calculating and sending action commands to the vibration motors. The user interface, based on the haptic feedback method, sending status messages by transmitting vibrations to alert the user. The group has successfully designed three trial versions of the glove. The first version has two sensors. If the sensor detects obstacles, the motor will vibrates, corresponding to the obstacles’ distance. The closer the obstacles are the stronger the motors vibrate. The second version solves the problem that the first version can only detect objects at body level by increasing the number of sensors from 2 to 4, also adding a sound warning system. After many tests, we still had troubles accurately calculating the obstacles because of several sound phenomena, which made us decide to create a new algorithm to exterminate the erroneous readings. Applying the new code to the third version has reduced the number of sensors back to 2, while ensuring obstacles can be detected at all head, body and foot levels, and the glove works better in reality conditions.

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