A Device to Digitally Enhance and Assist Perception

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The blind need a better way to get interpretable sensory data because current competing products and methods are too expensive or ineffective at compensating for the lack of sight. The essential design criteria included the following: (1) Main sensor detects objects within 2.5 meters of the user, (2) Main sensor identifies the shape of detected objects, (3) Peripheral sensors locate objects in a hemisphere in front of the user with a two meter radius centered on main sensor, (4) Outputs convey consistent, interpretable, non-visual data, (5) Battery life lasts 6 hours of use before recharge, (6) Device is comfortable for extended use, (7) Prototype is easily portable, (8) Prototype uses less than 8 gigabytes in storage, (9) Prototype uses less than 2 gigabytes of RAM, (10) Costs less than $1000, (11) Available in 2 months. The prototype did not meet the essential needs aspect of the design criteria. The prototype met all of the other design criteria, with 100% accuracy. The main sensor detected any object within 2.5 meters 30% of the time, while it detected the shape of the object 25% of the time. The device did not detect any peripheral objects, while it did output consistent, interpretable, non-visual data 34% of the time. The battery life lasts 1 hour. Based on the analysis, the next prototype will include other forms of input, such as multiple cameras in combination with ultrasonic sensors, and will include a more sophisticated output that takes advantage of output speed and direction.

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