A Vibrating Watch for the Visually Impaired

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In the United States, more than 3.4 million people are visually impaired, and many more are affected by hyperopia and presbyopia. Because these conditions cause objects nearby to appear unclear, small watch faces often fail to convey reliable time information. The goal of this project was to engineer a watch that allowed the visually impaired to receive accurate time information using specific vibrations on the wrist. Similar devices on the market are accurate within 5 minutes. A testing prototype was engineered using Arduino based modules, and three vibration patterns were designed. These vibrations were tested on volunteer participants (n = 31) and the participants relayed their perceived time back to the tester. The vibration pattern selected for the final prototype was significantly better than the other two patterns devised for this project ($p = 0.027$) and the commercially available devices ($p = 0.0001$). The final prototype conveyed time information with an average time deviation of 18.6 seconds. This watch could significantly improve the lives of all visually impaired people.