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Utilizing Mobile Devices? Tactile Feedback for Presenting Braille Characters: An Optimized Approach for Fast Reading and Long Battery Life

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Abstract: This paper develops a method for presenting the standard six-point Braille characters on mobile devices that feature tactile feedback. The proposed method views each Braille character as a twocolumn code, each column consisting of three points. The eight various combination of raised and lowered points of the three-point column are encoded with a single pattern of vibration, with the two columns of a Braille character are separated by a period of silence. The encoding scheme for the different point-combinations in a column is inspired by Morse code (a series of dots and dashes). Dots are represented by a small-duration vibration whereas dashes are represented by a longer-duration vibration. The encoding scheme is optimized to reduce the average reading time per character and to reduce the average power consumption per character. These optimizations target increasing the speed of reading and the mobile device?s battery life respectively. As a proof-of-concept, the proposed method is implemented and tested with twelve blind users and three non-blind users. The different parameters of the proposed method were tuned based on the testing results. The overall results suggest that the proposed method significantly reduces the average reading time per character and reduces the average power consumption per character when compared to existing methods that utilize the mobile device?s tactile feedback for presenting Braille characters.