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Multimedia Contents Expression Based-on 2D Braille and 3D Haptic User Interface for Visual Impairments

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Abstract. Visual impairments (VIs) have very limited and low vision to get information such as multimedia contents and reading matters indoors and outdoors. Because of their low vision, even faces of their family are hard to recognize. Therefore, there are some assistive devices and aids for VIs. In general, assistive means for individuals with VIs that they can provide simple guidance or some of information with guide dogs, walking canes, braille display devices. However, they have limitations in function to present multimedia contents like pictures, videos, paintings. Additionally, most of braille display devices for VIs represent text contents by a line with several of braille cells. To read and understand those contents, they must press buttons on braille device to progress other contents redundantly. In this paper, we describe methodology for VIs to get proper information from multimedia contents effectively using 2D braille display device and 3D haptic system. Furthermore, this research also proposes braille transformation of Daisy and EPUB format in 2D braille devices and representation of multimedia as 3D physical information using haptic devices for VIs. Finally, we introduce the border of research considering the efficient communication of information to VIs.

Keywords: haptic, braille, visual impairment, daisy format, braille transformation, haptic telepresence, disability, epub, vision disorder, assistive device.