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Testing the Effects of Distraction on Performance using Vibrotactile Signals

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Abstract: Vibrotactile technologies, which use the perception of vibration through touch, have been used in the past to support or replace methods of communication typically supported by the visual and auditory modalities. Due to its effectiveness, vibrotactile communication has been used specifically in the military for navigation, in the medical field for training, and within mobile devices. However, studies related to the study of the effects of mental stress and distraction on performance using vibrotactile communication, are few and far between. Thus, the objective of this effort is to conduct a research study to assess the effect of stress and distractions on human performance using vibrotactile signals. Sixteen participants, between the ages of 18 and 25 years, from the student population of Morgan State University were selected to participate in the study. A testing system was developed by integrating a head display unit with tactors and Raspberry Pi® computer system. Data on performance was collected on a driving simulator. The analysis of the data indicated that under the conditions of the experiment, the control group was more able to accurately judge the signal than the experimental group which was participated to distracting conditions. The details of the study have been presented in the paper.

Keywords: Vibrotactile, Vibrotactile communication, Distraction, Performance, Raspberry Pi®, Human engineering, Cognitive