

情報電子工学科 学会発表

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学会名	2ND DIGITAL HEALTH & WELLBEING CONFERENCE
演題名	Digital game devices using for basis of physiological measurements
発表者	Incorporating physiological measurement with gaming:, a novel future outlook of healthcare with digital gaming
内容	<p>[Abstract]</p> <p>Physiological measurements can provide useful information about diseases and health. Though the importance of detecting the acute stage of a disease through a measurement is already established, long-term physiological measurement providing chronological health information is being considered as a promising methodology for maintain one's health. The usefulness of long-term physiological measurement concept has been proven by several cohort studies such as the famous Ohasama study. However, sometimes, long-term continuous measurement is difficult for individuals without considerable intervention from medical doctors; in most cases, getting habituated to self-measurement depends on a subject's motivation.</p> <p>Moreover, recently, commercialized 3D VR headsets such as Oculus Rift, VIVE, and PlayStation VR have been introduced. We are now considering embedding a physiological sensor to a 3D VR headset that can automatically or arbitrarily record physiological measurements. Furthermore, some VR games are considerably popular among certain people and if VR headsets with physiological measurement sensors were distributed, these groups of people (perhaps, the so-called "Gamers") who play games daily would be automatically measured; consequently, a large amount of physiological data could be obtained. In this case, the "Gamers" could more easily maintain their health than other people who do not play games daily. We call this paradoxical future outlook as "incorporating physiological measurement with gaming" and believe that this can be a possible health management methodology in the near future. In our concept, we develop a sensor for photoplethysmography—arterial pulse sensing by light— that can be embedded in a VR headset and can measure pulse from the user's forehead. Then, it is proved that the arterial pulse can be stably measured during digital gaming. We also attempt to assess valance of the autonomic nervous system during gaming using pulse rate variability recorded by the photoplethysmogram. We have found that some events in games could cause transient sympathetic dominance. Currently, we are developing other physiological measurement sensors with game devices, including skin conductance monitors embedded in the VR headset and electrocardiogram measurement electrodes embedded in a game controller.</p> <p>In this presentation, our attempt of physiological measurement during gaming, its psychophysiological interpretation, and examples of physiological measurement embedded in game devices are shown. In addition, the potential of game devices not only for gaming, but also as a basis for physiological measurement is discussed.</p> <p>This work was partially supported by the Japan Society for the Promotion of Science KAKENHI Grant Number 15H02798.</p> <p>[Three learning outcomes that attendees will take home]</p> <ol style="list-style-type: none"> 1. Availability of game devices such as Virtual Reality headset and game controller as a basis for physiological measurement. 2. Example of physiological measurement and its psychophysiological interpretation during gaming. 3. A proposal of new long-term physiological measurement with using digital game. <p>[Themes this abstract fits into]</p> <p>Games for Health, Technology in the Future, Long-term Conditions</p>