

博士論文審査結果の要旨

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論文題目	E-learning system focusing on emotional aspect using biological signals -Boredom detection by eye tracking-
<p>[論文審査の要旨]</p> <p>論文の概要は以下のとおりである。</p> <p>E-learning is a computer-based content and instructional methods designed to build knowledge and skills for individuals and organization. Although the learners' emotional states apparently have considerable effects on the learning process, the available e-learning systems do not detect the symptoms of the learners' emotional states.</p> <p>This thesis discussed a new e-learning system design focusing on emotional aspects using biological signals. The new system design was proposed and some prototypes were constructed for evaluation experiments. The first experimental result clarified the importance of emotional state of learners during learning. The second experimental result clarified some useful indexes such as fixation duration and pupil diameter calculated from eye tracking data to estimate learner's emotions. The last experimental result showed the effectiveness of real-time feedback from eye tracking indexes for e-learning. The description of discussion and conclusions were derived from those results.</p> <p>本研究および関連研究の成果は、学会誌査読論文（日本感性工学会）1件（筆頭）（2件目は「照会后再査読」中）、国際会議（AHFEI2012、HCII2013等）10件（うち筆頭8件）、国際会議 workshop（SEATUC2013 workshop）1件（筆頭）、国内研究会（電子情報通信学会）1件（筆頭）である。</p> <p>審査においては、予備審査での指摘事項は修正されていたが、さらに「最後の実験におけるアルゴリズムの独創性をもっと明確に記載すると良い」との指摘や、「本研究は応用範囲が広く発展性もあることから、その具体例を future work として記載することにより論文の完成度が一層高まる」との助言があった。そこで、本研究は博士（工学）を授与するに十分値するものと考えられ、全員一致で「合格」と決定されたが、指摘および助言に基づく修正・加筆を行い、最終的な論文とする。</p>	

論 文 要 旨

Thesis Abstract

2015 年 03 月 04 日

※報告番号	甲 第 176号	氏 名 (Name)	Saromporn Charoenpit
主論文題名 (Title) E-learning System focusing on Emotional Aspect using Biological signals -Boredom detection by eye tracking-			
内容の要旨 (Abstract) <p>E-learning is a computer-based content and instructional methods designed to build knowledge and skills for individuals and organization. The disadvantages of e-learning include lack of immediate feedback in asynchronous e-learning and potentially more such negative emotions as frustration, anxiety, and confusion. When learners have negative emotions, they usually do not learn well. Therefore, to cope with those is considered to be a key issue. Therefore, I proposed and designed a new e-learning system with real-time feedback focusing on the learners' emotions. To realize the e-learning system, biological sensors and analyze of learners' emotions were added into the system.</p> <p>At first, the study is proposed the design of a new e-learning system focusing on emotional aspects. The feature of this system is to give feedback from emotional aspect.</p> <p>Second, the study focused on estimation of various emotions to confirm importance of their detection using questionnaire. The experimental results suggest that emotional aspects should be taken into account to design interfaces or contents of an e-learning system at least for the difficult contents.</p> <p>Third, the study focused on estimation of learners' emotions by eye tracking. The fixation duration ratio, number of fixation ratio and pupil diameter ratio were useful to analyze learners' negative and positive emotions. The experimental results suggest that the eye metric results are considered more reliable than the questionnaire results.</p> <p>Finally, the thesis implemented a prototype of the e-learning system with real-time feedback to help learners escape from boredom. To provide appropriate feedback to the learner, a caution module was added into the prototype employing fixation duration and pupil diameter as metrics for boredom detection. The experimental results indicated that this e-learning system with real-time feedback focusing on escaping boredom has potential to be applicable for helping learners to continue learning.</p>			