The encoding analysis of characteristic frequency bands of brain wave during learning /

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ABSTRACT

The present literatures almost discuss about context-aware applications by the elements of Global Positioning System (GPS) which can detect a geographical position, and Radio Frequency Identification (RFID) which discriminates from a status. It performs that the mobile learning of the conditions which in outside a student can be perceived. Mostly, the functions of the related sensors detect the conditions which outside a student. Basically, the traditional learning assessment mechanism is a passive and negative assessment mechanism, which cannot provide an real-time learning warning mechanism for teachers or students to find out problems as early as possible (including such learning conditions as " absence of mind" resulting from poor learning stage or physical or psychological factor), and the post-assessment mechanism also cannot assess the learning effectiveness provided by the online learning system. From a viewpoint of cognitive neuroscience, this research proposes the technique of digital encoding of brain-wave characteristic frequency bands to discriminate from the feature of brain wave when performing a student's online learning or computer game. The experiments proceeded by catching brain wave signals of human vision while sensing the test interfaces of graphics and words representing learning or computer games by brain wave sensor. To compile the related samples of energies from brain wave frequency band and times of appearances, then establish the characteristic frequency bands of brain wave and its digital coding modes which stand for the statuses of learning, deep sleeping, playing computer games and taking a break. The proposed digital encoding technique not only can discriminate from whether for a student to concentrate, and for it to learn or to perform a computer game, but it can recognize from performing the heterogeneous games of which kind of character. It can turn out that a teacher and the partner of study also bring about the cause of a student's learning disability, and the system not only can provide a student with the system of the early warning of instant study, but can offer suitable consideration and encouragement.

Keywords: Context-Aware　Cognitive Neuroscience　Digital Encoding

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