SUMMARY OF Ph.D. DISSERTATION

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Title

Communication Supporting Method Based on Estimation of Thinking Degree

Abstract

This research proposes the method for facilitating communication and utilizing communication records based on estimation of thinking degree (whether a participant is thinking or not).

Communication for solving problem and transmitting knowledge can be failed because it is difficult to aware thinking degree of participants, though such type of communication is one of essential elements in knowledge-based society. Also utilizing records of such communication can be less than successful due to lack of information on when and to what degree participants were thinking. With these issues in mind, thinking degree of participants is estimated and the estimation results are provided to participants to facilitate communication. Also those results are recorded in synchronization with contents, including conversations, to utilize records of communication.

EEG (Electroencephalogram) is used in order to extract participants' thinking conditions. EEG is suitable for estimating thinking degree because it changes under the influence of thinking activities of the brain. Also EEG can be measured by a small device, observed continuously, and seldom be controlled by participants. The appropriate frequency range of EEG for estimating thinking degree is specified based on the results of experiment. Moreover, the past EEG data is used for estimation because thinking seems to be a sequential process and not to be performed in a mere instant. Thinking degree is calculated as MS-Level (Mental-State Level) using these factors.

As to communication in which knowledge is transmitted from a trainer to trainees, MS-Levels are described as a superimposed sphere on each trainee's head. This makes it possible for a trainer to comprehend trainees' conditions and instruct flexibly by considering their thinking degrees. As to remote communication in which participants discuss difficult issues with each other, the change of MS-Level of himself/herself is reflected in the state of each participant's PC display. The whole of view is zoomed in as if the participant inclines forward when he/she is thinking, and zoomed out as if he/she inclines backward when not thinking. This makes it possible for each participant to aware his/her degradation of thinking activities and try to keep thinking. As to recording communication, MS-Level of each scene is recorded in synchronization with contents as index. Using these indices, a digest movie is generated by joining scenes in which the MS-Level average of all the participants is high. This makes it possible for a third person to find important scenes easily.

According to the results of experiment, the proposed method successfully provides an environment in which people can communicate smoothly and flexibly by considering each other's thinking degree. Moreover, this method contributes to extracting important scenes of communication.