DETECTION OF CHANGES IN MINDFULNESS BY MONITORING MEDITATION SESSIONS USING ARTIFICIAL NEURAL NETWORKS AND MULTI AGENT TECHNOLOGY

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Declaration

I declare that this dissertation does not incorporate, without acknowledgment, any material previously submitted for a Degree or a Diploma in any University and to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organization.

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Abstract

Meditation has gained lot attraction in modern world. Nevertheless most meditation teachers and practitioners are not fully aware what the expectation is. In most of the meditation centers, the novice meditators follow the wrong way because they cannot track the progress and get proper feedback. It is hard to analyze the success rate and there isn't a way to measure the success. If there is any possibility to monitor the progress of the meditation, then people certainly can improve on their meditation.

In this research, an attempt was made to monitor EEG signals of meditation sessions with ANN technology and multi agent based approach. The proposed solution has the ability to collect the EEG data from expert meditators which has been used to train the artificial neural network. Next the EEG signals of the novice meditator were given as the input to the trained ANN for classification which outputs whether it is successful or unsuccessful. EEG capturing device has been used to collect the EEG data in a non-invasive method. EEG device sends data via Bluetooth. Artifact removal has been done to remove eye related artifacts which are captured by the device. The multi agent system will interpret the EEG signals and provide the recommended meditation technique. Communication and Negotiation among the agents result in more acceptable interpretation by modulating the arguments made by the agents. This multi agent system has been implemented to run of java based jade platform. This experiment used 25 meditators (age ranged between 20 and 65 years). The experiment was done as two stages. First the meditation solution which is trained with expert meditators' data was used to monitor the meditation session of novice. And the number of times which matched was counted. Next the meditators were asked to stay without meditating. It has been proved that meditation session has the ability to provide more attention. The accuracy rate is 72%. The multi agent system is successfully providing the feedback by recommending the meditation technique.

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