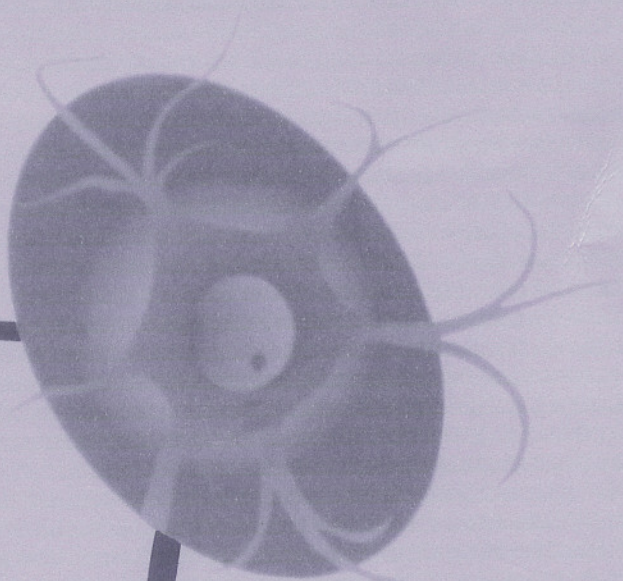
Experimental NEUROBIOLOGY



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ABSTRACTS

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NEURONAL SPIKE TRAIN DECODING FOR THE BRAIN-COMPUTER INTERFACE USING NONLINEAR FILTER BASED ON SUPPORT VECTOR MACHINE

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For the brain-computer interface based on the activities of multiple cortical neurons, the decoding algorithm, which extracts the information on the movement parameters encoded within the neuronal spike train, is essential. We devised and implemented several decoding algorithms based on linear and nonlinear filtering in order to confirm the necessity of the nonlinear filter. Their performances were evaluated under various conditions by changing the number of neurons within the spike train, the length and the frequency of input to the decoding algorithms, and type and rates of error for the spike detection and classification. We confirmed the general superiority of nonlinear filters. The support vector machine showed the highest performance.

Key Words: Spike train, Training, Error rates, Decoding performance, BCI