

Pattern recognition for exact synchronization in the brain applied over MEG recordings

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Identifying thoughts from different brain activities is a difficult challenge faced by many researchers in many labs around the world. Successes have been reported in identifying whether a person is thinking about one object (for example an elephant) or another object (like a car). In this paper, we present a technology for the first time to identify which of the numbers 1,2,3,4, or 5 a person is thinking of. We used brain recording via MEG (Magnetoencephalography). We developed methodology and algorithms for characterizing properties of brain activity related to different numbers (e.g. number 2 and number 3) and distinguished between brain activity during different visual stimuli of the same number (e.g. the figure 3 or three circles). Guessing which one-digit number a person is thinking of was done via MEG recording. 100 percent accuracy can be reached after 45 seconds (on average) of trials, and for many cases after 15 seconds. This is the most refined thought identification that has been achieved so far. The newly developed methods include geometric characteristics-based encoding of MEG recordings and a multidimensional distance function that measures virtual distance among matrices with numerical entries.

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