Methods for Identifying Neuronal Spikes

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a software package designed to automate identification of neuronal spikes.

Overview

Electrodes placed deep within the brain can deliver electrical impulses directly to nerve centers for the treatment of movement disorders such as Parkinson's disease and dystonia. The electrodes must be placed precisely, based on which neurons fire during particular stimuli. However, it is difficult for human operators to distinguish neuronal activity spikes from background noise or other neurons, making it difficult to identify the proper place for the electrodes. This task becomes virtually impossible because the number of electrodes recording simultaneously is immense.

The Invention

UW-Madison researchers have developed a software package designed to automate identification of neuronal spikes and sort them by neuron virtually independent of human intervention. Electrode probes are inserted into the brain and advanced by the software until they read the firing of neurons. That firing is then recorded as spikes of activity. The spikes vary by shape, amplitude, frequency, and period. The software compares spikes to templates based on previously recorded spikes, eliminates spikes from non-neuronal sources, and creates a map of brain activity.

Applications

- Surgery to treat movement disorders
- Any device that requires measuring neuronal activity, such as future neuron-prosthetic devices

Key Benefits

- Decreases the training needed to discern neuronal spikes
- Runs in real time
- Increases the efficacy and efficiency of surgeries for movement disorders by more precisely locating positions for permanently implanted therapeutic electrodes
- Decreases the time needed to locate permanent electrode positions
- Automatically advances electrode probes into the brain until neuronal spike is measured
- Minimizes human judgment and error
- Groups neuronal spikes by variation and identifies the neurons producing each spike

Target Fields

- Medical Devices : Neurological devices

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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