New Method That Allows Unsupervised Cluster Analysis

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method of sorting data sets into clusters.

Overview

Just as two points may appear closer in two-dimensional space than they actually are in three dimensions, it is difficult to tell under multiple dimensions how similar two points are. To sort data with multiple dimensions, current applications require an estimate of the number of data clusters present. A statistical method that could sort data with multiple dimensions would be useful for many applications, but has been perfected in this embodiment as a guide for placing therapeutic electrodes in the brain of patients suffering from neurological diseases such as Parkinson's.

The Invention

UW-Madison researchers have developed a method of analyzing N-dimensional data using proximity in N-dimensional space to group data into an unknown number of clusters. First, a processor measures the similarities between all data points based on N-dimensional distance where N is the number of parameters recorded. The point in closest proximity to a number of other points is then selected as the index point for one cluster. If the distance from the index point to its nearest neighbor falls within a predetermined, statistically significant value, it becomes a member of that cluster. The distance from the cluster to the next nearest neighbor is then evaluated, and so forth until a point fails to be significantly close. The points from the completed cluster are removed from the data set and the process is repeated to find the next cluster.

Applications

- Helps guide an electrode probe through the brain in deep brain stimulation surgery
- Can be used to sort data sets into clusters for many applications, including computer based search programs and correlation of gene or protein expression to traits or conditions

Key Benefits

- Reduces the time required for electrode placing in deep brain stimulation surgery
- Helps determine the electrical pulse signal of specific brain regions
- Automatically sorts data with multiple dimensions
- Can be executed by processor; does not require the presence of an expert
- Clusters based on similarity of characteristics

Technology

- Medical Devices : Neurological devices

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