Processing Diffusion Magnetic Resonance Imaging Data

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Technology description

Market Opportunity

Brain abnormalities affect millions of people annually. The brain tumor diagnosis market is projected to reach $773.1 million by 2025. Further, more than 1.7 million North Americans suffer annually from traumatic brain injury. White matter tractography is a specialized magnetic resonance imaging (MRI) technique that helps doctors understand brain tracts and allows them to study white matter structures. These brain tracts are not identifiable by direct exam, CT, or MRI scans. This technique is a non-invasive way to probe microscale characteristics of living biological tissues, such as brain water diffusion. Diffusion data is needed to more accurately evaluate tumors, trauma and inflammation, but is difficult to monitor. Existing methods for processing this type of data fail to provide comprehensive results for certain white matter structures.

USC Solution

USC researchers have developed an imaging method that offers improvements in tractography results, particularly in regions of the brain where white matter structure is very complicated. The high resolution information gathered using this technology provides information about the orientation of the molecule being monitored. For example, white matter tissue tends to have significantly faster diffusion when aligned with an axon. This valuable information will help detect and evaluate a patient’ s pathology.

Application area

Magnetic Resonance Imaging
Neuroscience
White Matter Tractography

Advantages

Increase diagnostic accuracy
Offers insights about white matter that were previously unknown

High resolution, three-dimensional data

Institution

University of Southern California