

# A Method for Estimating Perfusion Parameters in Magnetic Resonance Perfusion-weighted Images

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## Technology description

### Summary

UCLA researchers in the Department of Radiological Sciences and the Department of Neurology have developed a novel algorithm for processing perfusion-weighted magnetic resonance images to estimate perfusion parameters.

### Background

Perfusion-weighted magnetic resonance images (PWI) allow extraction of parameters including blood flow, blood volume, blood velocity and blood oxygenation, and use them as diagnostic indicators for medical conditions, such as intracranial tumors, stroke, and neurodegenerative diseases. Current techniques apply singular value decomposition to deconvolute the source image signal and obtain perfusion features, which are then used for characterizing the tissue properties. However, this deconvolution process may introduce distortions that influence the measurement of perfusion parameters and the decoupling of delay. In addition, perfusion parameters can vary depending on the different deconvolution methods used, leading to inconsistent prediction and discrepancies in diagnosis.

### Innovation


UCLA researchers have developed a novel spatiotemporal deep convolution neural network architecture for processing PWI data that can learn to accurately estimate the perfusion parameters at the voxel level by using paired 4D detectors. This new method provides accurate approximation of the perfusion parameters, and also works as an alternative to overcome the limitations of current deconvolution methods.

## Application area

 Perfusion-weighted MRI for disease diagnosis and disease monitoring

## Advantages

### Advantages

 Provides accurate approximation of perfusion parameters base on perfusion-weighted magnetic resonance images

 Compatible with different hardware systems and protocols

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