

Multiparametric Imaging with PET Scans Using High Temporal-Resolution Dynamic Data Acquisition and Modeling

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ABSTRACT

Researchers at the University of California, Davis, have developed a method to acquire and model high temporal resolution (1-2 seconds per frame) dynamic data with PET scans.

FULL DESCRIPTION

Current clinical PET scanning methods and data modeling allow for a temporal resolution of 5-10 seconds per frame with compromised image quality. A high temporal resolution dynamic PET scan can attain a higher temporal resolution, around 2 seconds per frame, but currently cannot be adequately resolved. New methodologies and models are needed to obtain and optimize high-resolution dynamic PET scanning data.

Researchers at the University of California, Davis, have developed a method to acquire and model high temporal resolution PET scans that are a function of temporal and spatial locations. This model is able to directly estimate blood flow and blood volume from the dynamic PET data using a single tracer injection. Using this method, for example, one can obtain simultaneous imaging of blood flow and glucose metabolism using a single dynamic ^{18}F -FDG PET scan. This has applications in characterization of flow-metabolism mismatch or coupling in aggressive tumors, myocardial viability, and brain function in neurodegenerative diseases.

APPLICATIONS

- ▶ Data analysis of high temporal resolution PET scans
- ▶ Single tracer multiparametric imaging (e.g., perfusion-metabolism imaging by ^{18}F -FDG)
- ▶ Blood flow imaging and analysis
- ▶ Characterization of tumor aggressiveness in cancer therapy
- ▶ Myocardial viability in coronary artery disease
- ▶ Brain function in neurodegenerative diseases

FEATURES/BENEFITS

- ▶ Derives blood flow without a flow-specific tracer
- ▶ Allows for a reduced imaging time, cost, and radiation dose
- ▶ Requires only one tracer injection
 - ▶ Applicable to any radiotracers
- ▶ Is effective in all regions, including regions where extraction fraction is low
- ▶ Applicable to all existing clinical PET scanners

RELATED MATERIALS

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INVENTORS

- ▶ Wang, Guobao

OTHER INFORMATION

KEYWORDS

PET scan, high temporal resolution, time-varying model, multiparametric imaging, dynamic data, single tracer

CATEGORIZED AS

- ▶ **Imaging**
 - ▶ Medical
- ▶ **Medical**
 - ▶ Diagnostics
 - ▶ Imaging
 - ▶ Other

RELATED CASES

2018-473-0

▶ • Wang GB. "High temporal-resolution dynamic PET image reconstruction using a new spatiotemporal kernel method". IEEE Trans Med Imaging. 2018 Sep 12. doi: 10.1109/TMI.2018.2869868. [Epub ahead of print]. - 09/12/2018

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,896,417	02/13/2024	2018-473

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Techniques for Improving Positron Emission Tomography Image Quality and Tracking Real-Time Biological Processes](#)
- ▶ [Quantitative Multiparametric PET/CT Imaging for Nonalcoholic Fatty Liver Diseases](#)

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