Improved Method for Real-Time Collection of Cardiac and Respiratory Raw Data During Clinical Imaging

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ABSTRACT

Researchers at the University of California, Davis have developed a comfortable method for compiling accurate, real-time, imaging data for heart and breathing without requiring additional external monitoring devices.

FULL DESCRIPTION

Photon imaging modalities - including positron emission tomography (PET) and single photon emission computerized tomography (SPECT) - are increasingly important both as diagnostic methods and for monitoring the progression of cancers, cardiovascular diseases, respiratory system function, and musculoskeletal disorders. However, image quality degradation can result from patient movements that often occur during conventional scanning techniques. This image degradation leads to reduced detection of clinically relevant medical conditions. Various methods exist to correct for these movements. However, additional devices or equipment (such as ECG, breathing belts, or optical markers) are often then required – making compiling a comprehensive view of the patient's condition more difficult and complex. Thus, new models for capturing and curating large volumes of diagnostic data are needed.

A process for extracting critical, cardiac and respiratory gating signals via real-time manipulation of raw data gathered via either PET or SPECT imaging has been validated. High temporal resolution has been achieved while minimizing patient discomfort. This technique is superior to current data-driven methods because of its flexibility to generate cardiorespiratory signals in real-time. In most cases, the need for additional, external, monitors to gather patient data - such as an electrocardiogram (EKG/ECG) or breathing belt – is also eliminated.

This method has been validated using existing PET scanner technologies. It can be integrated into any clinical PET or SPECT system via either software or hardware modifications. This new approach can play an essential role in the improved real-time detection and diagnosis of patient cardiac and respiratory conditions.

APPLICATIONS

- Real-time data gathering and compilation during imaging (including PET, SPECT, CT, X-ray, gamma camera, optical imaging)

FEATURES/BENEFITS

- Can eliminate the need for additional devices
- More patient-friendly
- Requires minimal changes to existing PET or SPECT hardware or software
- Produces a more comprehensive view of patient's medical condition

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2023/141603	07/27/2023	2021-902

Additional Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Techniques for Improving Positron Emission Tomography Image Quality and Tracking Real-Time Biological Processes

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OTHER INFORMATION

KEYWORDS

diagnostic imaging, PET, SPECT, CT, X-ray, gamma camera, optical imaging

CATEGORIZED AS

- **Imaging**
  - Medical
- **Medical**
  - Diagnostics
  - Imaging
  - Screening

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