A Mechanism and Method for Synthesis of a 2-D Gamma-ray Pinhole Projection Image from a Plurality of Slit Projection Images

Technology description

Invention

This is a 3D medical imaging technique that incorporates single photon emission computed tomography (SPECT) to image radioisotope distributions, which are generally used to detect/monitor cancer, drug delivery, etc. This imaging technique uses SPECT to take 2D and 3D tomographic images of radioisotope distributions, both of which can be analyzed separately at high resolution. In addition, the 2D data can be recovered, analyzed and sorted into groups by the angles where the images were taken. This technique can be used in preclinical and clinical subjects

Background

SPECT technology is critical in diagnosing varieties of cancer, studying drug delivery, and testing to cardiac perfusion. Unfortunately, current SPECT images contain high Poisson noise due to the low-photon collection efficacy of current pinhole collimators and pinhole apertures. In order to address this issue, inventors from the University of Arizona devised this technology, which incorporates a basic detector/collimator/pinhole combination to take images. The novelty lies in the optical setup, which is rotatable, allowing the system to take multiple images of a region of interest at different angles while the device itself remains stationary. Software is then used to process the images and ultimately produce a 3D image.

Application area

Cancer research and diagnosis
Hospitals, clinics, and other medical imaging labs

Advantages

Maintains high resolution without compromising field of view
Stationary and rotatable, allowing the system to take multiple images at different angles
Processes 2D images to construct a 3D image

Institution

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