Automated and Integrated System of PET, CT, and Ultrasound for Image-Directed Prostate Biopsies and Cancer Diagnosis

Published date: Aug. 7, 2012

Technology description

Market Summary

An estimated 1.5 million prostate biopsies are performed on men each year. To date, 2D transrectal ultrasound (TRUS) guided biopsy has been the clinical standard for prostate cancer diagnoses. 2D ultrasound cannot provide enough information to guide a biopsy needle into a 3D space. Twelve or more biopsies are taken from prostate tissue to attempt to capture prostate cancerous tissue. The physician inserts the 2D probe, captures the image, and tries to guide the needle into a suspected lesion. A conventional biopsy can miss up to 30% of cancers, which is likely due to the "blind" sampling that relies on probability and sometimes even guesswork. The ultrasound from TRUS does not allow for either localization of the biopsy needle or indication of disease spread and progression. There is currently no device that combines both ultrasound and PET/CT images.

Technical Summary

The current transrectal ultrasound-guided biopsy has two limitations. One is the 2D ultrasound imaging cannot provide accurate location information to guide the biopsy needle to lesion targets in three dimensions, and the second is ultrasound imaging itself has difficulty differentiating carcinoma from benign prostate tissue. Hence, currently available systems cannot accurately diagnose prostate cancer because of the number of uncertainties, low sensitivity, high noise levels, and sparse anatomic detail. Dr. Fei has developed a system that will eliminate many of these shortcomings. This system uses FACBC PET/CT and 3D TRUS images in order to segment and register images for use in an image-guided biopsy device as well as in image-guided therapies. The system is accurate, automated, and fully integrates the images and the biopsy device so that the healthcare provider can analyze the images and conduct the biopsy in real-time for increased successful procedures.

Application area

Software that automatically integrates both PET/CT and 3D ultrasound imaging for a molecular image-targeted prostate biopsy in real time.

Advantages

Incorporates both PET/CT imaging and 3D ultrasound imaging for improved accuracy of biopsy sampling and staging of prostate cancer.
Useful for image-targeted biopsy, brachytherapy, radiofrequency thermal ablation, cryotherapy, and interstitial photodynamic therapy.
The fusion software of PET/CT and ultrasound is also useful for prostate, ovarian, liver, and breast cancer detection.

Institution

Emory University

Inventors

Baowei Fei
Associate Professor
SOM: Rad: Physics & Comp Lab

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com