3D Imaging System to Evaluate Prostate Cancer using Ultrasound and PET/CT Scans

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Technology description

Market Summary

An estimated 1.5 million prostate biopsies are performed on men each year. To date, transrectal ultrasound (TRUS) guided biopsy has been the clinical standard for prostate cancer diagnoses. Using the 2D image from the TRUS, the physician must estimate the location of the biopsy needle based on the 2D information. A conventional biopsy can miss up to 30% of cancers, which is likely due to the "blind" sampling. The current ultrasound from TRUS does not allow for either localization of the biopsy needle or indication of disease spread and progression. An ideal prostate screening method would provide both an assessment of cancer cell location as well as allow for targeted prostate biopsy.

Technical Summary

TRUS paired with positron emission tomography (PET) and computed tomography (CT) substantially optimizes prostate cancer screening. Combining TRUS and PET/CT scans provides not only a precise account of prostate cancer metastasis, but also detects functional and metabolic changes associated with the disease. Using 3D non-rigid registration algorithm, Emory University researchers have developed a process for image transformation that extracts information generated from PET/CT technology and fuses it with TRUS imaging capabilities for targeted prostate cancer assessment. By integrating the data obtained from these individual systems, they have been able to create a hybrid approach that not only captures deformations at the prostate surface and interior but also abnormalities at the bladder neck regions as well. This platform imaging registration system is an advancement over traditional approaches in that it can more accurately determine biopsy needle placement as well as structural and biochemical changes associated with prostate cancer disease progression, thereby improving prostate diagnosis, assessment and measurements of treatment response.

Application area

Imaging system that combines multiple scans for prostate cancer diagnosis, staging, and treatment assessment.

Advantages

Optimizes biopsy targeting by providing a 3D assessment of metabolic, functional and anatomical defects on the prostate surface, interior, and bladder neck regions.
Increases the specificity and sensitivity of prostate examinations by providing a precise assessment of the location of cancer cells.

Institution

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