FESTIVAL OF CONTAGIOUS IDEAS 2016

NSW GOVERNMENT Health

NEW SOUTH WALES HEALTH INNOVATION Symposium 2016

Bob Leece Transforming Health Award

SeedTracker: Targeting prostate cancer for high precision radiotherapy

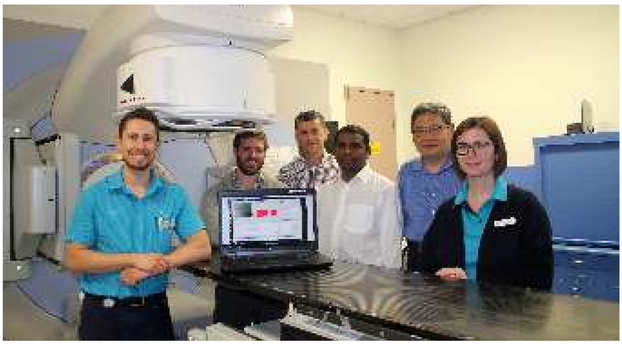
South Western Sydney Local Health District

Challenge

Stereotactic radiotherapy is a cutting edge treatment for prostate cancer, delivering significantly escalated radiation doses to maximise the cure rates. This technique mandates highly accurate treatment delivery. Prostate motion is known to occur during radiation treatment, which results in inaccurate and potentially ineffective radiotherapy if the prostate position is not monitored and corrected for. The radiation therapy treatment machines (linear accelerators) used in South Western Sydney Local Health District, similar to the majority of systems world-wide, do not have the ability to identify the prostate position during treatment delivery.

Solution

This project involved the development of methodology and software, 'SeedTracker', to enable cost-effective, novel real-time prostate position monitoring on general purpose radiotherapy treatment machines.



The developed methodology and software has the ability to

1. Automatically detect the position of gold fiducial seeds implanted in the prostate using the x-ray images acquired during the treatment
2. Compare the detected seed position to the expected position
3. Give precise advice to the user to ensure accurate treatment delivery.

Results

The clinical utilisation of the SeedTracker system has significantly improved the quality of stereotactic radiotherapy by enabling the accurate delivery of radiation dose to prostate cancer patients with high precision. Safety has also been enhanced through the protection of normal tissues from unnecessary radiation. SeedTracker has streamlined treatment delivery for prostate cancer patients, achieving approximately a 10 minute reduction (>25 per cent) in treatment time for each fraction of radiotherapy. This software could also be adapted to monitor tumour position during treatment of other cancer sites such as the liver, lung and central nervous system.

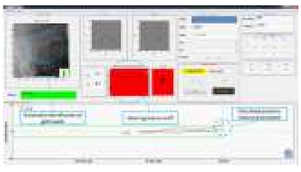


Figure legend:
The user interface of SeedTracker real-time position monitoring system.