

AbstractID: 11791 Title: Evaluation of 3D Surface Camera System in Patient Setup for HN RT

Purpose: To evaluate the usefulness of a 3D surface camera system (AlignRT) in detecting rigid and non-rigid setup errors during head and neck radiotherapy.

Methods and Materials: To evaluate the accuracy of AlignRT's surface registration algorithm, both translational and rotational movements of a known magnitude were manually applied in Pinnacle to transform a helical CT scan. The skin contours of both the primary helical CT scan and the transformed helical CT scan were transferred to AlignRT, where the transformed surface was registered to the primary surface. The changes that were reported by the AlignRT system were compared to the manually applied motions from Pinnacle.

To evaluate the usefulness of AlignRT for rigid and non-rigid patient setup, a retrospective analysis was performed on the helical CT scans of eleven patients. The registrations in Pinnacle based on bony (either skull (rigid) or vertebrae (non-rigid)) anatomy were compared to the surface (either head (rigid) or shoulder (non-rigid)) registrations in AlignRT.

Results: The accuracy of AlignRT's surface registration algorithm was, on average, 0.041 ± 0.036 degrees and 0.075 ± 0.100 mm. The accuracy of the optical system was, on average, 0.087 ± 0.912 degrees and -0.153 ± 1.996 mm. For shoulder (non-rigid) guidance, if we use 2*standard deviation for 95% confidence level, the accuracy of the optical system was within 3 degrees for rotations in the vertical and longitudinal directions, but 5 degrees for the lateral direction. For translations, the accuracy was more than 10 mm.

Conclusion: While the feasibility of using the AlignRT system for head (rigid) guidance in the setup of HN patients was demonstrated, the use of the system in non-rigid patient setup yielded undesirable results.

Conflict of Interest: None.