

Needle Localization In CT-Guided Tumor Ablation

Giang Hoang (giang@jhu.edu)

Mentors: Dr. Sheng Xu, Dr. Michael Kassin, Dr. Bradford Wood

Group 14 - Room 06

Clinical Problem:

- Under-treated or over-treated tumors are common in tumor ablation procedure → Tumor recurrence or complications

Project Goals:

- Localize and identify the orientation of the ablation needles in intraoperative CT images to support needle insertion accuracy
- Generate and superimpose predicted ablation zone on CT images for visualization

Results:

- Needle Tip Localization: MSE = **0.8 mm**, STDEV = 0.6 mm
- Needle Orientation: Mean Error = **0.6 deg**, STDEV = 0.4 deg
- Ablation Zone Approximation: Ellipsoid Model
- Runtime: Less than 30 seconds per image

