DBP: Head and Neck Cancer

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Head & neck cancer: Statistics

• Between 4-6% of all new cancer cases
• About 60,000 new cases per year
• 60% present with advanced disease
• 5 year survival: 57%
• Multimodal treatment
Head & neck cancer sites

Image credit: American Cancer Society (www.cancer.org)
Proton therapy

15MV Photons vs SOBP Protons

Relative Depth Dose [%]

Depth [cm]
Anatomic change
Recontouring

CT 1

Def Reg

Vector field

Warper

CT 1 contours

CT 2 with contours
Recontouring
Beam placement

CT 1

Rigid Reg

CT 2 resliced

Commercial TPS

CT 2 with recomputed dose
Dose recaluation
Dose recalculation

![Brainstem graph with CT 1 and CT 2 lines]
Dose recalculation

Brainstem Dmax (Gy)
Dose recalculation
Moving forward

• Automatic segmentation
  • Atlas-based segmentation (head and neck)
  • Intra-subject segmentation (head and neck)
  • Interactive segmentation

• Automatic registration
  • Hybrid image/pointset methods (prostate)
  • Sliding organs (thorax)
Engineering plan

• Support for adaptive radiotherapy in NA-MIC

• Four goals
  – DICOM-RT interchange
  – Structure and dose warping
  – Interactive deformable registration
  – Plan review
DICOM-RT interchange

• Current Status
  • Two CLP modules
  • NA-MIC tutorial

• Outstanding Issues
  • Points of interest
  • RT Plan support
  • Nested structures
  • Structure names
  • others…
Structure set and dose warping

- Current status
  - Command line module
  - NA-MIC tutorial

- B-spline or Vector field
  - Compatible with DICOM-RT import/export
Interactive deformable registration

• Current status
  – Command line module
  – NA-MIC tutorial
  – Three RBF types
  – Regularization
  – Vector field export
Plan review

• Current status (WIP)
  • Dose volume histogram module (Pinter)
  • Dose comparison/isodose module (Shusharina)
Thank you from the DBP team

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