

**PARENT CATEGORY:**

**Informatics**

**SUB CATEGORY:**

**Result Communication and Reporting**

TITLE

Automatic 3D Volume Extraction from 2D Annotations

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PURPOSE

To derive three-dimensional (3D) volumes from two-dimensional (2D) Annotation and Image Markup (AIM) based radiological annotations and compute their volumetric properties automatically.

METHOD AND MATERIALS

Radiologists create image-based annotations to denote regions of clinical significance. Most PACS workstations do not allow 3D volume annotation. Instead, radiologists draw line segments to measure anatomy with volumetric properties. PACS software saves these line segments without semantically linking segments belonging to the same volume. As a result, radiologists manually summarize volumetric quantities in a text-report.

We propose an open-source software that automatically derives 3D volumes from unstructured 2D annotations. Our software leverages the AIM standard which attempts to unify radiological annotation formats across PACS systems. Our software finds all line segments present in AIM annotations and uses a line-clustering algorithm to group segments into bounding volumes. Seed points are automatically generated for each volume and fed into a level-set segmentation algorithm to obtain segmented volumes and their volumetric measurements. These can be used in summary generation systems like VITA to generate visual summaries highlighting segmented anatomy along with their corresponding volumetric sizes.

RESULTS

The proposed software automatically derives 3D volumetric information by first clustering semantically unlinked 2D AIM annotations into approximate volumes and then seeds segmentation algorithms within the volumes to compute segmented anatomies.

CONCLUSION

Our software enhances the way radiologists communicate volumetric observations. Automated volume computation relieves radiologists from the burden of manually summarizing volumetric observations in the text report.

## CLINICAL RELEVANCE/ APPLICATION

The proposed software is compatible with any AIM enabled PACS system. This application can have an immediate impact on imaging results reporting.

FIGURE (OPTIONAL)

