

CT-ORG: CT volumes with multiple organ segmentations

Summary

This dataset consists of 140 computed tomography (CT) scans, each with five organs labeled in 3D: lung, bones, liver, kidneys and bladder. The brain is also labeled on the minority of scans which show it.

Patients were included based on the presence of lesions in one or more of the labeled organs. Most of the images exhibit liver lesions, both benign and malignant. Some also exhibit metastatic disease in other organs such as bones and lungs.

The images come from a wide variety of sources, including abdominal and full-body; contrast and non-contrast; low-dose and high-dose CT scans. 131 images are dedicated CTs, the remaining 9 are the CT component taken from PET-CT exams. This makes the dataset ideal for training and evaluating organ segmentation algorithms, which ought to perform well in a wide variety of imaging conditions.

The dataset includes large and easily-located organs such as the lungs, as well as small and difficult ones like the bladder. We hope the dataset will enable widespread adoption of multi-class organ segmentation, as well as competitive benchmarking of algorithms for it.

The data are divided into a testing set of 21 CT scans, and a training set of the remaining 119. For the training set, the lungs and bones were automatically segmented by morphological image processing. For the testing set, the lungs and bones were segmented manually. All other organs were segmented manually in both the training and testing sets. Manual segmentations were done with ITK-SNAP (<https://www.itksnap.org>), starting with semi-automatic active contour segmentation followed by manual clean-up. The source code for the morphological algorithms is available at:

- <https://github.com/bbrister/ctOrganSegmentation.git>

Many images were borrowed from the Liver Tumor Segmentation (LiTS) challenge, which the organizers have generously allowed us to distribute. For more information, see the following website and paper:

- <https://lits-challenge.com>

- Arxiv [1901.04056] The Liver Tumor Segmentation Benchmark (LiTS) (<https://arxiv.org/abs/1901.04056>)

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Data Access

Data Access

Data are provided in NIfTI format via Box.

Data Type	Download all or Query/Filter
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Images (16.9 GB across 4 zips)	Download volumes 0-49 (4.7 GB) Download volumes 50-99 (5.3 GB) Download volumes 100-139 (6.6 GB) Download labels and README (259 MB)
Segmentation code (external link)	
Data description	README.txt

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Detailed Description

Detailed Description

Image Statistics	
Modalities	NIfTI CT and segmentations
Number of Participants	140
Number of Studies	140
Number of Series	280
Number of Images	280
Images Size (GB)	16.9 GB

- CTs and segmentations are saved in Nifti-1 (.nii.gz) format. Each Nifti-1 file stores the entire CT volume in Hounsfield units. Segmentations are in patient-native space (no change in registration).
- Note: several volumes appear to be left-right flipped relative to others. Please contact the authors or help@cancerimagingarchive.net if this causes confusion.
- The source code for the morphological algorithm (bone and lung segmentation) is available here: <https://github.com/bbrister/ctOrganSegmentation.git>
- Please explore [README.txt](#) that is also bundled in the zip with the label files.

Citations & Data Usage Policy

Citations & Data Usage Policy

Users of this data must abide by the [TCIA Data Usage Policy](#) and the [Creative Commons Attribution 3.0 Unported License](#) under which it has been published. Attribution should include references to the following citations:

Data Citation

Blaine Rister, Kaushik Shivakumar, Tomomi Nobashi and Daniel L. Rubin. (2019) **CT-ORG: CT volumes with multiple organ segmentations [Dataset]** . DOI: [10.7937/tcia.2019.tf7f4v7o](https://doi.org/10.7937/tcia.2019.tf7f4v7o)

Acknowledgement

1. **CT organ segmentation using GPU data augmentation, unsupervised labels and IOU loss.** Blaine Rister, Darvin Yi, Kaushik Shivakumar, Tomomi Nobashi and Daniel L. Rubin. <https://arxiv.org/abs/1811.11226>
2. Arxiv [1901.04056] **The Liver Tumor Segmentation Benchmark (LiTS)** <https://arxiv.org/abs/1901.04056>

TCIA Citation


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Other Publications Using This Data

TCIA maintains [a list of publications](#) which leverage TCIA data. If you have a manuscript you'd like to add please [contact the TCIA Helpdesk](#).

Versions

Version 1 (Current): Updated 2020/01/09

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