

CT Lymph Nodes

Summary

This collection consists of Computed Tomography (CT) images of the mediastinum and abdomen in which lymph node positions are marked by radiologists at the National Institutes of Health, Clinical Center. Radiologists at the *Imaging Biomarkers and Computer-Aided Diagnosis Laboratory* labeled a total of 388 mediastinal lymph nodes in CT images of 90 patients and a total of 595 abdominal lymph nodes in 86 patients.

The collection is aimed at the medical image computing community for developing and assessing computer-aided detection methods. Automated detection of lymph nodes can be an important clinical diagnostic tool but is very challenging due to the low contrast of surrounding structures in CT and to their varying sizes, poses, shapes and sparsely distributed locations. This data set is made available to make direct comparison to other detection methods in order to advance the state of the art.

Acknowledgements






We would like to acknowledge the individuals and institutions that have provided data for this collection:

National Institutes of Health, Bethesda MD. Special thanks to **Dr. Holger R. Roth** and **Dr. Ronald Summers**, *Imaging Biomarkers and Computer-Aided Diagnosis Laboratory*, Grant Magnuson Clinical Center.

Data Access

Data Access

Click the **Download** button to save a ".tcia" manifest file to your computer, which you must open with the [NBIA Data Retriever](#). Click the **Search** button to open our Data Portal, where you can browse the data collection and/or download a subset of its contents.

Data Type	Download all or Query/Filter
Images (DICOM, 57.8GB)	 
Med ABD Lymph Annotations (ZIP)	
Med Lymph Candidate Nodes (ZIP)	
Med ABD Lymph Masks (ZIP)	

Click the Versions tab for more info about data releases.

Detailed Description

Detailed Description

Collection Statistics	
Modalities	CT
Number of Participants	176
Number of Studies	176
Number of Series	176
Number of Images	110,103
Images Size (GB)	57.8

The DICOM files were created from volumetric images (Analyze and NifTI) using this from ITK: http://www.itk.org/Doxygen/html/Examples_2IO_2ImageReadDicomSeriesWrite_8cxx-example.html.

Annotation files

[MED_ABD_LYMPH_ANNOTATIONS.zip](#) (new 6/24/2015). The annotations include a folder for each case with text files of voxel indices, physical coordinates, size measurements and a [MITK](#) point set file (.mps), which can be visualized using the [MITK workbench](#) (Note: only release 2014.10.0 and later supports visualization of point set files using the "point set interaction plugin"). Abdominal size measurements include the longest and shortest axis in axial view of a lymph node. The shortest axis is used for the RECIST criteria. The mediastinal set only includes the shortest axis.

Mediastinal and abdominal lymph nodes

Computer-generated candidate detections for mediastinal and abdominal lymph nodes (produced by methods in [K. Cherry et al., SPIE Med. Img. 2014] and [J. Liu et al., SPIE Med. Img. 2014])). See attached: [MED_ABD_LYMPH_CANDIDATES.zip](#) (new 9/14/2015).

[MED_ABD_LYMPH_MASKS.zip](#) (new 12/8/2015): These files contain a compressed NifTI image (*.nii.gz) for each patient with manually traced lymph node segmentations. Note: these segmentation masks were produced independently to the centroid annotations in [MED_ABD_LYMPH_ANNOTATIONS.zip](#). There is an overlapping set of lymph nodes marked in both files but the indexing does not align.

Please cite the following paper when using the segmentation masks:

A Seff, L Lu, A Barbu, H Roth, HC Shin, RM Summers. Leveraging Mid-Level Semantic Boundary Cues for Automated Lymph Node Detection. Medical Image Computing and Computer-Assisted Intervention–MICCAI 2015, 53-61 (http://link.springer.com/chapter/10.1007/978-3-319-24571-3_7)

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:

i Data Citation

Roth, H., Lu, L., Seff, A., Cherry, K. M., Hoffman, J., Wang, S., Liu, J., Turkbey, E., & Summers, R. M. (2015). **A new 2.5 D representation for lymph node detection in CT [Data set]**. The Cancer Imaging Archive. <https://doi.org/10.7937/K9/TCIA.2015.AQIIDCNM>

i Publication Citation

Roth, H. R., Lu, L., Seff, A., Cherry, K. M., Hoffman, J., Wang, S., Liu, J., Turkbey, E., & Summers, R. M. (2014). **A New 2.5D Representation for Lymph Node Detection Using Random Sets of Deep Convolutional Neural Network Observations**. In Medical Image Computing and Computer-Assisted Intervention – MICCAI 2014 (pp. 520–527). Springer International Publishing. https://doi.org/10.1007/978-3-319-10404-1_65

i Publication Citation

Seff, A., Lu, L., Cherry, K.M., Roth, H.R., Liu, J., Wang, S., Hoffman, J., Turkbey, E.B., & Summers, R.M. **2D view aggregation for lymph node detection using a shallow hierarchy of linear classifiers**. Medical Image Computing and Computer-Assisted Intervention--MICCAI 2014, p544-552, 2014. (<http://arxiv.org/abs/1408.3337>)

i Publication Citation

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Seff, A., Lu, L., Barbu, A., Roth, H., Shin, H.-C., & Summers, R. M. (2015). **Leveraging Mid-Level Semantic Boundary Cues for Automated Lymph Node Detection**. In Lecture Notes in Computer Science Medical Image Computing and Computer-Assisted Intervention–MICCAI 2015 (pp. 53–61). Springer International Publishing. https://doi.org/10.1007/978-3-319-24571-3_7

i TCIA Citation






Clark, K., Vendt, B., Smith, K., Freymann, J., Kirby, J., Koppel, P., Moore, S., Phillips, S., Maffitt, D., Pringle, M., Tarbox, L., & Prior, F. (2013). **The Cancer Imaging Archive (TCIA): Maintaining and Operating a Public Information Repository**. Journal of Digital Imaging, 26(6), 1045–1057. <https://doi.org/10.1007/s10278-013-9622-7>

Other Publications Using This Data

TCIA maintains [a list of publications](#) that leverage our data. At this time we are not aware of any publications based on this data. If you have a publication you'd like to add please [contact the TCIA Helpdesk](#).

Versions

Version 4 (Current): Updated 2015/12/14

Data Type	Download all or Query/Filter
Images (DICOM, 57.8GB)	  (Requires the NBIA Data Retriever .)
Med ABD Lymph Annotations (ZIP)	
Med Lymph Candidate Nodes (ZIP)	
Med ABD Lymph Masks (ZIP)	

[MED_ABD_LYMPH_MASKS.zip](#) added via the wiki.

Version 3: Updated 2015/09/14

[MED_ABD_LYMPH_CANDIDATES.zip](#) added via the wiki.

Version 2: Updated 2015/06/24

[MED_ABD_LYMPH_ANNOTATIONS.zip](#) added via the wiki.

Version 1: Updated 2015/03/16

Image data set uploaded