

Prostate Fused-MRI-Pathology

Summary

This collection comprises a total of 28 3 Tesla T1-weighted, T2-weighted, Diffusion weighted and Dynamic Contrast Enhanced prostate MRI along with accompanying digitized histopathology (H&Estained) images of corresponding radical prostatectomy specimens. The MRI scans also have a mapping of extent of prostate cancer on them [1]. Each surgically excised prostate specimen was originally sectioned and quartered resulting in 4 slides for each section. Each of these individual slides was digitized at 20x magnification using an Aperio slide scanner resulting in a set of 4 .svs images. Each of the 4 .svs images were then digitally stitched together to constitute a pseudo-whole mount section (.tiff) using the program in [2]. Annotations of cancer presence on the pseudo-whole mount sections were made by an expert pathologist. Slice correspondences were established between the individual T2w MRI and stitched pseudo-whole mount sections by the program in [3] and checked for accuracy by an expert pathologist and radiologist. Deformable co-registration [4] was employed to spatially co-registered the corresponding radiologic and histopathologic tissue sections to map disease extent onto the corresponding MRI scans.

Data collection and analysis was provided by Anant Madabhushi, PhD, Case Western Reserve University and Michael D. Feldman, MD, PhD, Hospital at the University of Pennsylvania. This work was supported by NIH R01CA136535.





References


1. Singanamalli, A. , Rusu, M. , Sparks, R. E., Shih, N. N., Ziober, A. , Wang, L. , Tomaszewski, J. , Rosen, M. , Feldman, M. and Madabhushi, A. (2016), **Identifying in vivo DCE MRI markers associated with microvessel architecture and gleason grades of prostate cancer.** *J. Magn. Reson. Imaging*, 43: 149-158. doi:[10.1002/jmri.24975](https://doi.org/10.1002/jmri.24975) (PMID:26110513).
2. Toth, R, Feldman, M, Yu, D, Tomaszewski, J, Madabhushi, A. “**Histostitcher™: An Informatics Software Platform for Reconstructing Whole-Mount Prostate Histology using the Extensible Imaging Platform (XIP™) Framework.**” *Journal of Pathology Informatics*, vol. 5, pg. 8, 2014 (PMID: 24843820, PMCID: PMC4023035).
3. Xiao, G, Bloch, N, Chappelow, J, Genega, E, Rofsky, N, Lenkinsky, R, Tomaszewski, J, Feldman, M, Rosen, M, Madabhushi, A. “**Determining Histology-MRI Slice Correspondences for Defining MRI-based Disease Signatures of Prostate Cancer.**” *Special Issue of Computerized Medical Imaging and Graphics on Whole Slide Microscopic Image Processing*, vol. 35[7-8], pp. 568-78, 2011 (PMID: 21255974).
4. Chappelow, J, Bloch, N., Rofsky, N, Genega, E, Lenkinski, R, DeWolf, W, Madabhushi, A. “**Elastic Registration of Multimodal Prostate MRI and Histology via Multi-Attribute Combined Mutual Information.**” *Medical Physics*, vol. 38[4], pp. 2005-2018, 2011 (PMID: 21626933).

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, 4.4 GB) |   |
| Annotated Whole Slide Pathology Images (76.8 GB) |   |

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|-----------------------------|---|
| Fused Rad-Path Matlab Files |  |
|-----------------------------|---|

Please note that Box has a 15GB download limit, so you will need to download images in batches.

Click the Versions tab for more info about data releases.

Detailed Description

Detailed Description

| Collection Statistics | Radiology Image Statistics | Pathology Image Statistics |
|-----------------------|----------------------------|----------------------------|
| Modalities | MRI | Pathology, Matlab |
| Number of Patients | 28 | 16 |
| Number of Studies | 29 | N/A |
| Number of Series | 325 | N/A |
| Number of Images | 32,508 | 114 |
| Image Size (GB) | 4.4 | 76.8 |

Supporting Documentation

The data set is fully described in the following publications:

1. Singanamalli, A. , Rusu, M. , Sparks, R. E., Shih, N. N., Ziober, A. , Wang, L. , Tomaszewski, J. , Rosen, M. , Feldman, M. and Madabhushi, A. (2016), **Identifying in vivo DCE MRI markers associated with microvessel architecture and gleason grades of prostate cancer.** *J. Magn. Reson. Imaging*, 43: 149-158. doi:[10.1002/jmri.24975](https://doi.org/10.1002/jmri.24975) (PMID:26110513).
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4. Chappelow, J, Bloch, N., Rofsky, N, Genega, E, Lenkinski, R, DeWolf, W, Madabhushi, A, “**Elastic Registration of Multimodal Prostate MRI and Histology via Multi-Attribute Combined Mutual Information,**” *Medical Physics*, vol. 38[4], pp. 2005-2018, 2011 (PMID: 21626933).

Pathology and Matlab Data

Reconstructed, annotated whole slide pathology as well as fused Rad-Path matlab objects are also available at <https://pathology.cancerimagingarchive.net/pathdata/>.

Citations & Data Usage Policy

Citations & Data Usage Policy

This collection is freely available to browse, download, and use for commercial, scientific and educational purposes as outlined in the [Creative Commons Attribution 3.0 Unported License](#). See TCIA's [Data Usage Policies and Restrictions](#) for additional details. Questions may be directed to help@cancerimagingarchive.net.

Please be sure to include the following citations in your work if you use this data set:

Data Citation

Madabhushi, A., & Feldman, M. (2016). **Fused Radiology-Pathology Prostate Dataset**. The Cancer Imaging Archive. doi: [10.7937/K9/TCIA.2016.TLPMR1AM](https://doi.org/10.7937/K9/TCIA.2016.TLPMR1AM)

Publication Citation

1. Singanamalli, A. , Rusu, M. , Sparks, R. E., Shih, N. N., Ziober, A. , Wang, L. , Tomaszewski, J. , Rosen, M. , Feldman, M. and Madabhushi, A. (2016), **Identifying in vivo DCE MRI markers associated with microvessel architecture and gleason grades of prostate cancer**. J. Magn. Reson. Imaging, 43: 149-158. doi:[10.1002/jmri.24975](https://doi.org/10.1002/jmri.24975) (PMID:26110513).
2. Toth, R, Feldman, M, Yu, D, Tomaszewski, J, Madabhushi, A, “**Histostitcher™: An Informatics Software Platform for Reconstructing Whole-Mount Prostate Histology using the Extensible Imaging Platform (XIP™) Framework**,” *Journal of Pathology Informatics*, vol. 5, pg. 8, 2014 (PMID: 24843820, PMCID: PMC4023035).
3. Xiao, G, Bloch, N, Chappelow, J, Genega, E, Rofsky, N, Lenkinsky, R, Tomaszewski, J, Feldman, M, Rosen, M, Madabhushi, A, “**Determining Histology-MRI Slice Correspondences for Defining MRI-based Disease Signatures of Prostate Cancer**,” Special Issue of Computerized Medical Imaging and Graphics on Whole Slide Microscopic Image Processing, vol. 35[7-8], pp. 568-78, 2011 (PMID: 21255974). <https://doi.org/10.1016/j.compmedimag.2010.12.003>
4. Chappelow, J, Bloch, N., Rofsky, N, Genega, E, Lenkinski, R, DeWolf, W, Madabhushi, A, “**Elastic Registration of Multimodal Prostate MRI and Histology via Multi-Attribute Combined Mutual Information**,” *Medical Physics*, vol. 38[4], pp. 2005-2018, 2011 (PMID: 21626933).

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. **The Cancer Imaging Archive (TCIA): Maintaining and Operating a Public Information Repository**, *Journal of Digital Imaging*, Volume 26, Number 6, December, 2013, pp 1045-1057. ([paper](#))







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 1 (Current) Updated 11-30-2016

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| Images (DICOM, 4.4 GB) |   (Requires the NBIA Data Retriever .) |
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