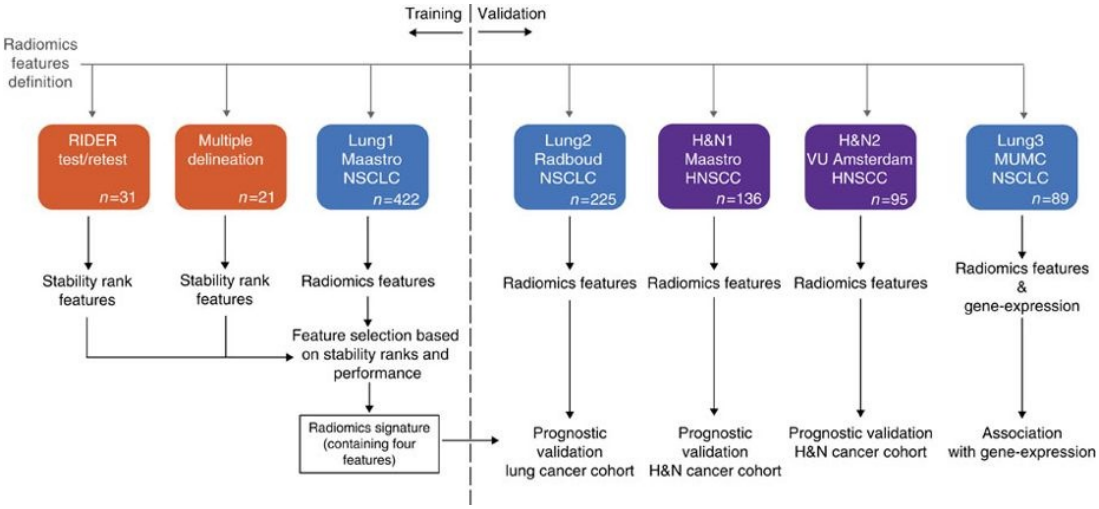
HEAD-NECK-RADIOMICS-HN1

Summary

Redirection Notice

This page will redirect to https://www.cancerimagingarchive.net/collection/head-neck-radiomics-hn1/ in about 5 seconds.

This collection contains clinical data and computed tomography (CT) from 137 head and neck squamous cell carcinoma (HNSCC) patients treated by radiotherapy. For these patients a pre-treatment CT scan was manual delineated by an experienced radiation oncologist of the 3D volume of the gross tumor volume. This dataset refers to the "H&N1" dataset of the study published in Nature Communications (http://doi.org/10.1038/ncomms5006). At time of previous publication, images of one subject had been unintentionally overlooked. In short, the publication used a radiomics approach to computed tomography data of 1,019 patients with lung or head-and-neck cancer.



Radiomics refers to the comprehensive quantification of tumor phenotypes by applying a large number of quantitative image features. In the published analysis, 440 features quantifying tumor image intensity, shape, and texture were extracted. We found that a large number of radiomic features have prognostic power in independent data sets, many of which were not identified as significant before. Radiogenomics analysis revealed that a prognostic radiomic signature, capturing intra-tumor heterogeneity, was associated with underlying gene-expression patterns. These data suggest that radiomics identifies a general prognostic phenotype existing in both lung and head-and-neck cancer. This may have a clinical impact as imaging is routinely used in clinical practice, providing an unprecedented opportunity to improve decision-support in cancer treatment at low cost.

This dataset is provided as open access to support repeatability and reproducibility of research in radiomics. This dataset will be the subject of an upcoming article addressing FAIR radiomics practices to support transparency, harmonization and collaboration on radiomics.

From version 2 (release date 09/20/2019) onwards we included the primary neoplasm gross tumour volume delineations in DICOM SEGMENTATION as well as DICOM RTSTRUCT files that accompanied the DICOM axial images. This dataset is provided as open access to support repeatability and reproducibility of research in radiomics. This dataset will be the subject of an upcoming article addressing FAIR radiomics practices to support transparency, harmonization and collaboration on radiomics.

Other data sets in the Cancer Imaging Archive that were used in the same study published in Nature Communications: NSCLC-Radiomics, NSCLC-Radiomics-Genomics, NSCLC-Radiomics-Interobserver1, RIDER-LungCT-Seg.

For scientific or other inquiries about this dataset, please contact TCIA's Helpdesk.

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- Frank Hoebers, MAASTRO (Dept of Radiotherapy), Maastricht University Medical Centre+, Maastricht, Limburg, The Netherlands.
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- Hugo Aerts, Computational Imaging and Bioinformatic Laboratory, Dana-Farber Cancer Institute & Harvard Medical School, Boston, Massachusetts, USA.

Data Access

Data Access

Some data in this collection contains images that could potentially be used to reconstruct a human face. To safeguard the privacy of participants, users must sign and submit a TCIA No Commercial Limited Access License to help@cancerimagingarchive.net before accessing the data.

Data Type	Download all or Query /Filter	License
Images, Segmentations, and Radiation Therapy Structures (DICOM, 11.8 GB)	*Download* *Search* (Requires NBIA Data Retriever.)	TCIA No Commercial Limited
Clinical Data (CSV, zip, 3 kB)	*Download*	CC BY-NC 3.0
Data Dictionary (txt, 5 kB)	*Download*	CC BY-NC 3.0

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Detailed Description

Detailed Description

Image Statistics	
Modalities	CT, PT, RTSTRUCT, SEG
Number of Participants	137
Number of Studies	137
Number of Series	486

Number of Images	28918
Images Size (GB)	28918

Citations & Data Usage Policy

Citations & Data Usage Policy

Users must abide by the TCIA Data Usage Policy and Restrictions. Attribution should include references to the following citations:

Data Citation

Wee, L., & Dekker, A. (2019). **Data from HEAD-NECK-RADIOMICS-HN1** [Data set]. The Cancer Imaging Archive. https://doi.org/10.7937/tcia.2019.8kap372n

Publication Citation

Aerts HJWL, Velazquez ER, Leijenaar RTH, Parmar C, Grossmann P, Carvalho S, Bussink J, Monshouwer R, Haibe-Kains B, Rietveld D, Hoebers F, Rietbergen MM, Leemans CR, Dekker A, Quackenbush J, Gillies RJ, Lambin P. **Decoding Tumour Phenotype by Noninvasive Imaging Using a Quantitative Radiomics Approach**, Nature Communications, Volume 5, Article Number 4006, June 03, 2014. DOI: http://doi.org/10.1038/ncomms5006

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.** In Journal of Digital Imaging (Vol. 26, Issue 6, pp. 1045–1057). Springer Science and Business Media LLC. https://doi.org/10.1007/s10278-013-9622-7 PMCID: PMC3824915

Questions may be directed to help@cancerimagingarchive.net.

Other Publications Using This Data

TCIA maintains a list of publications which leverage our data. If you have a manuscript you'd like to add please contact the TCIA Helpdesk.

1. Bielak, L., Wiedenmann, N., Berlin, A., Nicolay, N. H., Gunashekar, D. D., Hagele, L., . . . Bock, M. (2020). Convolutional neural networks for head and neck tumor segmentation on 7-channel multiparametric MRI: a leave-one-out analysis. Radiat Oncol, 15(1), 181. doi:https://doi.org/10.1186/s13014-020-01618-z
2. Choi, Y., Nam, Y., Jang, J., Shin, N. Y., Ahn, K. J., Kim, B. S., . . . Kim, M. S. (2020). Prediction of Human Papillomavirus Status and Overall Survival in Patients with Untreated Oropharyngeal Squamous Cell Carcinoma: Development and Validation of CT-Based Radiomics. AJNR Am J Neuroradiol, 41(10), 1897-1904. doi: https://doi.org/10.3174/ajnr.A6756
3. Gifford, R. C. (2022). Deep Learning Architecture to Improve Edge Accuracy of Auto-Contouring for Head and Neck Radiotherapy. (Master of Science MS). Ohio State UNiversity, Retrieved from http://rave.ohiolink.edu/etdc/view?acc_num=osu1658317931555616
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5. Kalendralis, P. (2022). Artificial intelligence applications in radiotherapy: The role of the FAIR data principles. (Ph.D. Dissertation). Maastricht University ,The Netherlands, Available from https://doi.org/10.26481/dis.20221010pk
6. Kalendralis, P., Shi, Z., Traverso, A., Choudhury, A., Sloep, M., Zhovannik, I., . . . Wee, L. (2020). FAIR-compliant clinical, radiomics and DICOM metadata of RIDER, interobserver, Lung1 and head-Neck1 TCIA collections. Med Phys. doi:https://doi.org/10.1002/mp.14322
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8. Li, J., Qiu, Z., Zhang, C., Chen, S., Wang, M., Meng, Q., . . . Zhang, X. (2022). ITHscore: comprehensive quantification of intra-tumor heterogeneity in NSCLC by multi-scale radiomic features. Eur Radiol. doi:https://doi.org/10.1007/s00330-022-09055-0
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10. Lv, W., Zhou, Z., Peng, J., Peng, L., Lin, G., Wu, H., . . . Lu, L. (2023). Functional-structural Sub-region Graph Convolutional Network (FSGCN): Application to the Prognosis of Head and Neck Cancer with PET/CT imaging. Computer Methods and Programs in Biomedicine. doi:https://doi.org/10.1016/j.cmpb.2023.107341
11. Moitra, D., & Mandal, R. K. (2022). Classification of malignant tumors by a non-sequential recurrent ensemble of deep neural network model. Multimed Tools Appl, 1-19. doi:https://doi.org/10.1007/s11042-022-12229-z
12. Zhinan, L., Wei, Z., Yudi, Y., Yabing, D., Yuanzhe, X., & Xiulan, L. (2022). Prediction of Human Papillomavirus (HPV) Status in Oropharyngeal Squamous Cell Carcinoma Based on Radiomics and Machine Learning Algorithms: A Multi-Cohort Study. Systematic Reviews in Pharmacy.

Versions

Version 3 (Current): Updated 2020/07/29

Data Type	Download all or Query/Filter
Images (DICOM, 11.8 GB)	*Download* *Search* (Requires NBIA Data Retriever.)
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Data Dictionary (txt)	*Download*

Added the chemotherapy schedule to the clinical data; one extra column added which is “chemotherapy_given”.

Added data dictionary for clinical data.

Version 2: Updated 2019/09/20

Data Type	Download all or Query/Filter
Images (DICOM, 11.8 GB)	*Download* *Search* (Requires NBIA Data Retriever.)
Clinical Data (CSV)	*Download*

Added DICOM Segmentations

Version 1: Updated 2019/07/25

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