Radiomics

Images are more than Pictures, they are Data

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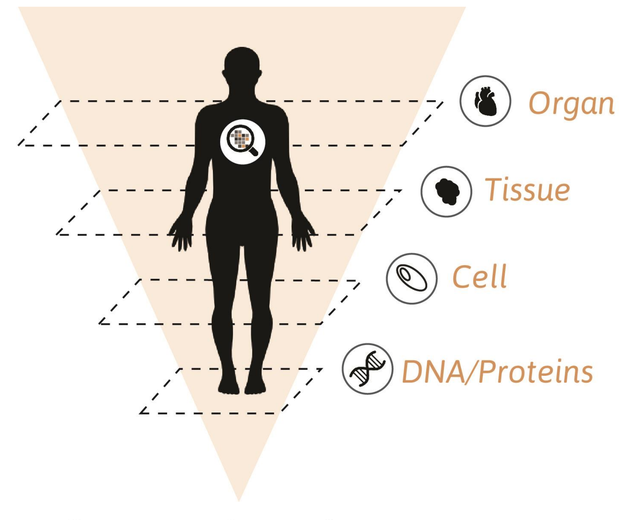
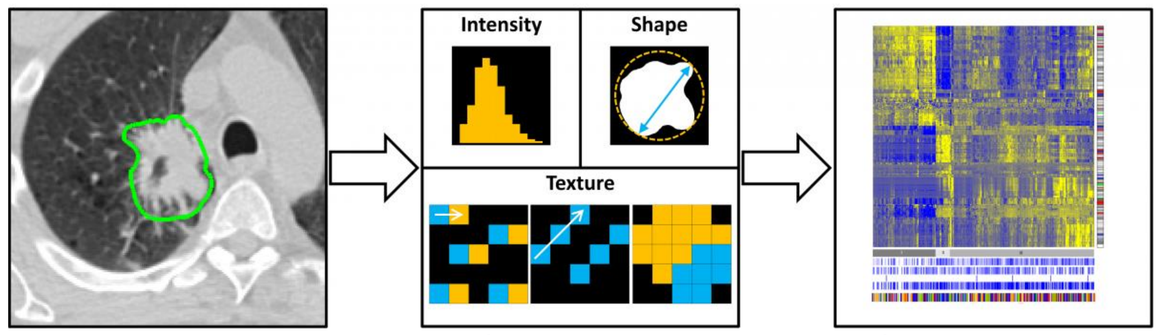


What is Radiomics?

Radiomics is a new scientific field which aims to convert the petabytes of unstructured cancer imaging data, available in hospitals worldwide, into minable, structured data.

Radiomics extracts in a high-throughput manner intensity, shape and texture features from standard-of-care imaging. These features can predict treatment response and outcomes (e.g. survival), and correlate with the underlying biology of the cancer.

Ultimately Radiomics tries to convert pictures to data and use those data to improve cancer therapy and outcomes.

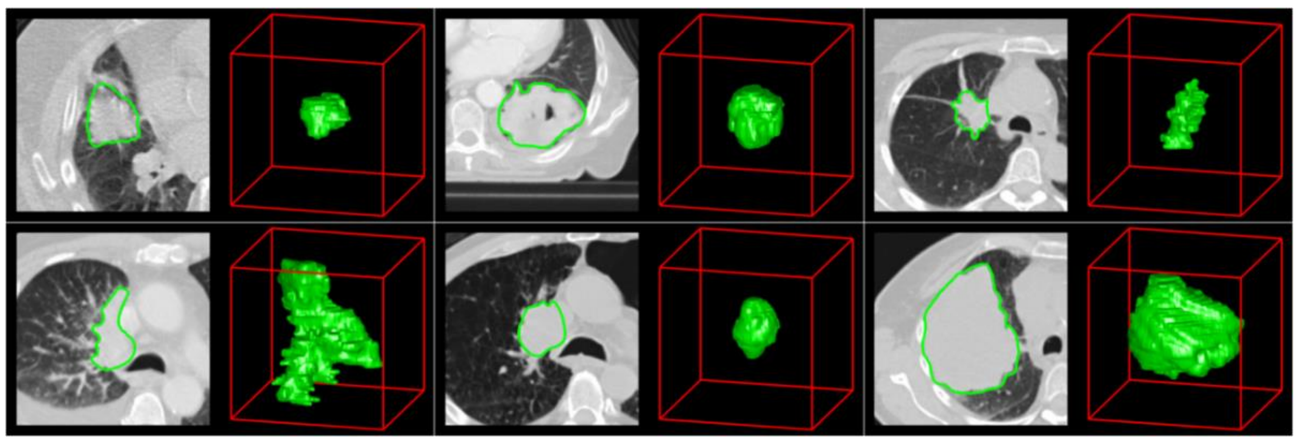


Imaging & Segmentation | *Radiomics Extraction* | *Relation to Genomics & Cancer Outcomes*

What data was shared and what were the challenges?

From 422 Dutch lung cancer patients (6 examples on the right)

- Imaging data (Computed Tomography)
- Segmentation data (3D) of the gross tumor volume
- Gene expression data (for a subset of 88)
- Clinical data
  - Age, Gender
  - Histology, Cancer TNM Stage
  - Survival



Challenges overcome included

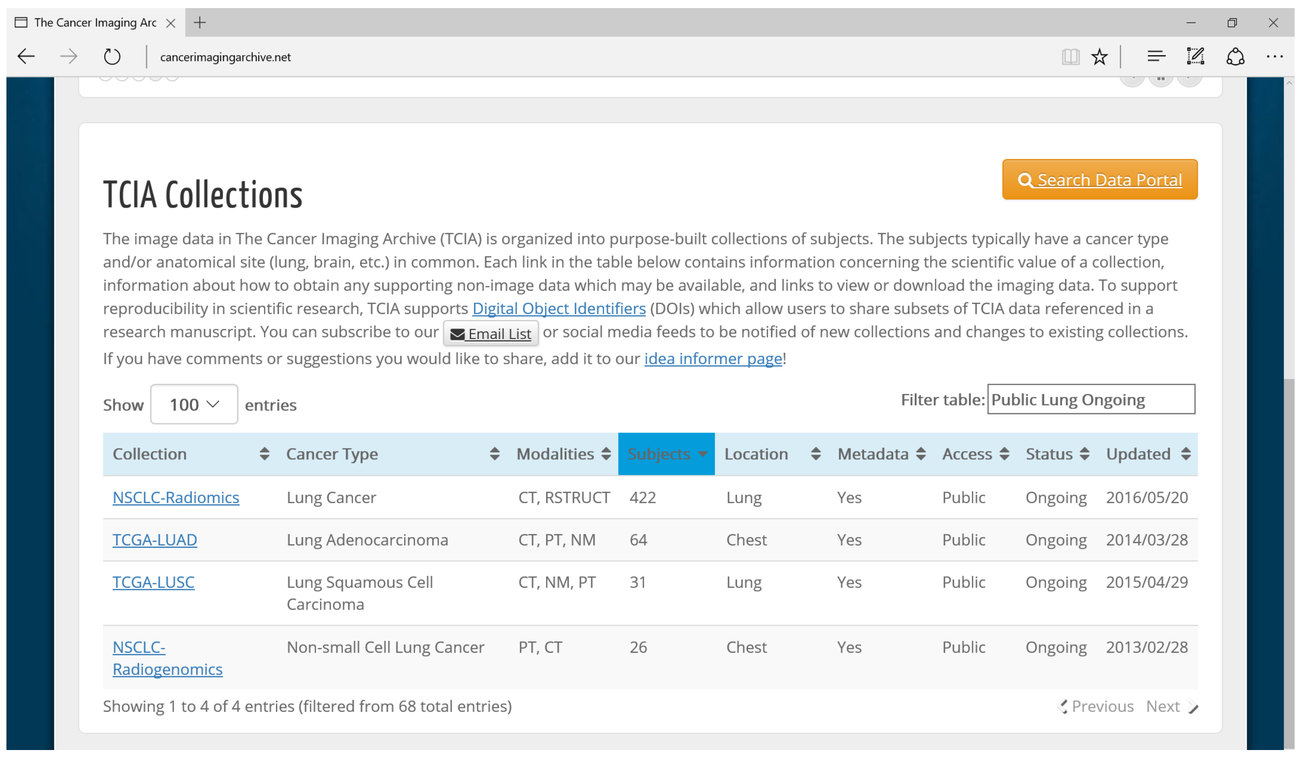
- Ethical / legal framework for sharing images of patients
- Privacy and de-identification, independently verified by external reviewers
- Quality of images, segmentation and terminologies to make sure data reuse is as easy as possible

Where can I find the data?

The data can be found at the Cancer Imaging Archive (http://www.cancerimagingarchive.net), an USA-based NIH-supported online archive where researchers can share imaging data and the public can download the images.

This collection is freely available to browse, download, and use for scientific and educational purposes as outlined in the Creative Commons Attribution 3.0 Unported License.

DOI: http://doi.org/10.7937/K9/TCIA.2015.PF0M9REI



References

1. http://radiomics.org/
2. Aerts HJ et al. Decoding tumour phenotype by noninvasive imaging using a quantitative radiomics approach. Nat Commun. 2014 Jun 3;5:4006. .