



CIR

Use Case

Medical Information for Radiologists

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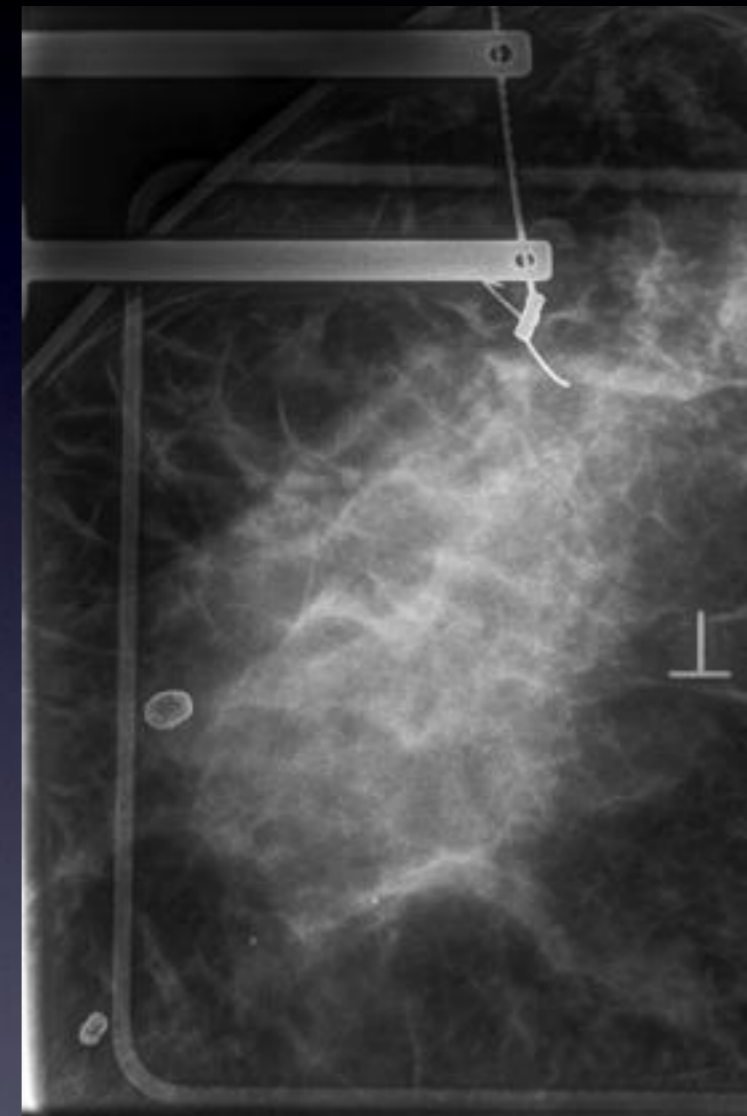
Outline

- **Scenario:** clinical radiology today
- **Need:** Emerging need for efficient access to knowledge
- **Use case:** medical information for radiologists
- Implementation

- I will only talk about images, not text search.

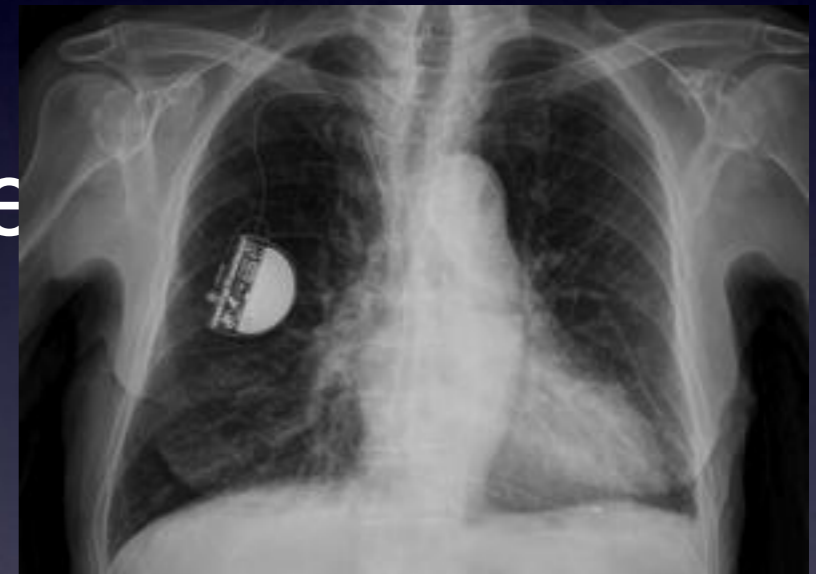
Radiology 2010 - 2014

- **Increasing demands**
 - Increasing age
 - Increasing awareness
 - Early detection
 - Image guided therapy



Radiology 2010 - 2014

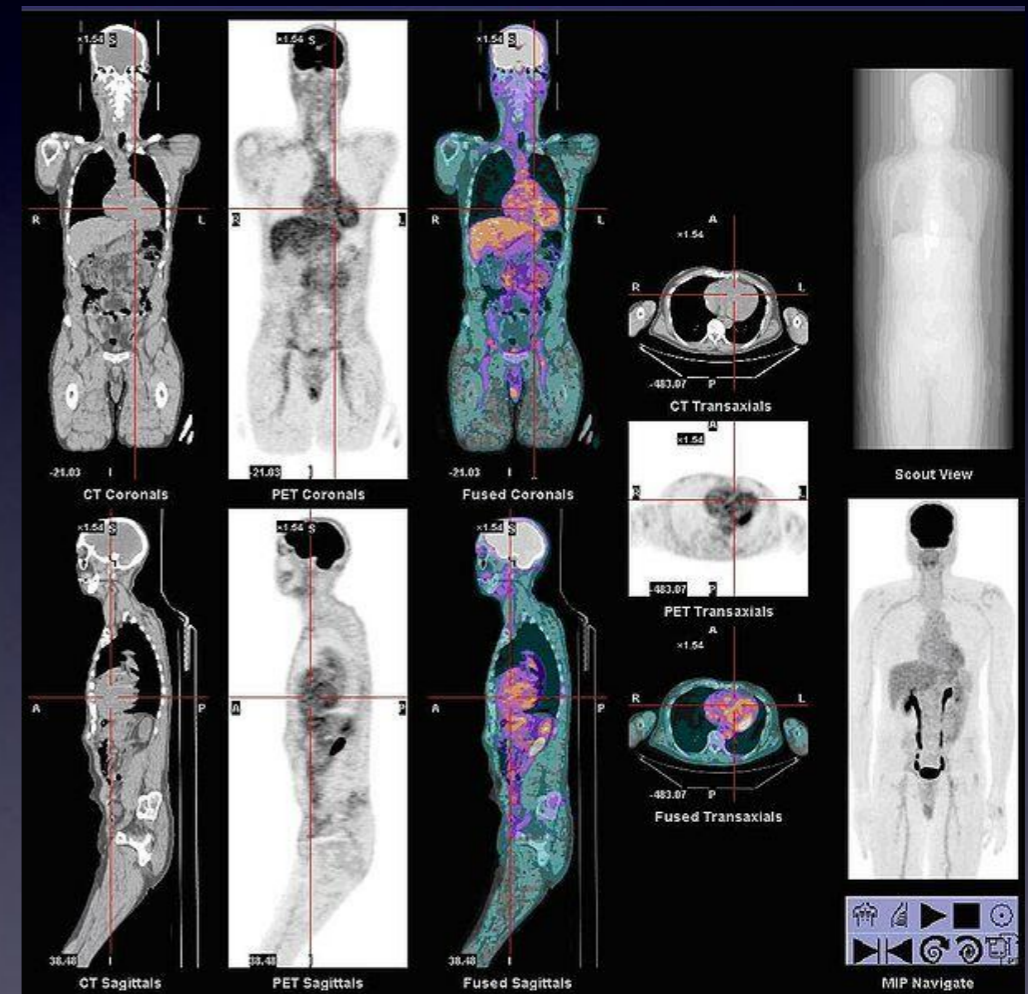
- Rising costs vs. shrinking budgets.
- Increasing **specialization**
 - growing number of subspecialties
 - Organ systems
 - Clinical fields
- Rising importance of decision **support** for **non-specialists**



Radiology 2010 - 2014

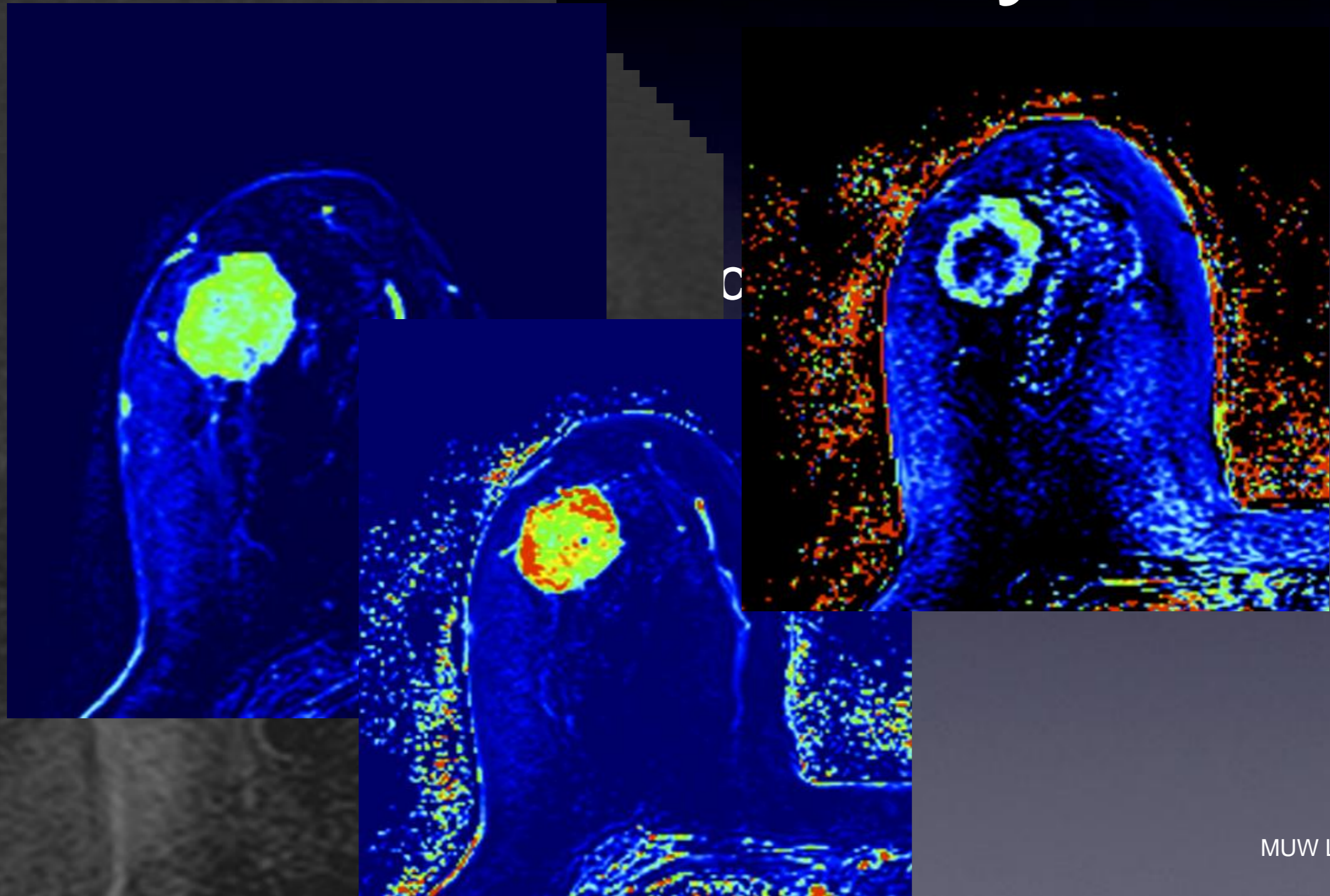
- Increasing image complexity

- evolving technologies
- 2D - 3D - 4D
- multi-modality-imaging
- functional imaging
- molecular imaging
- imaging biomarkers

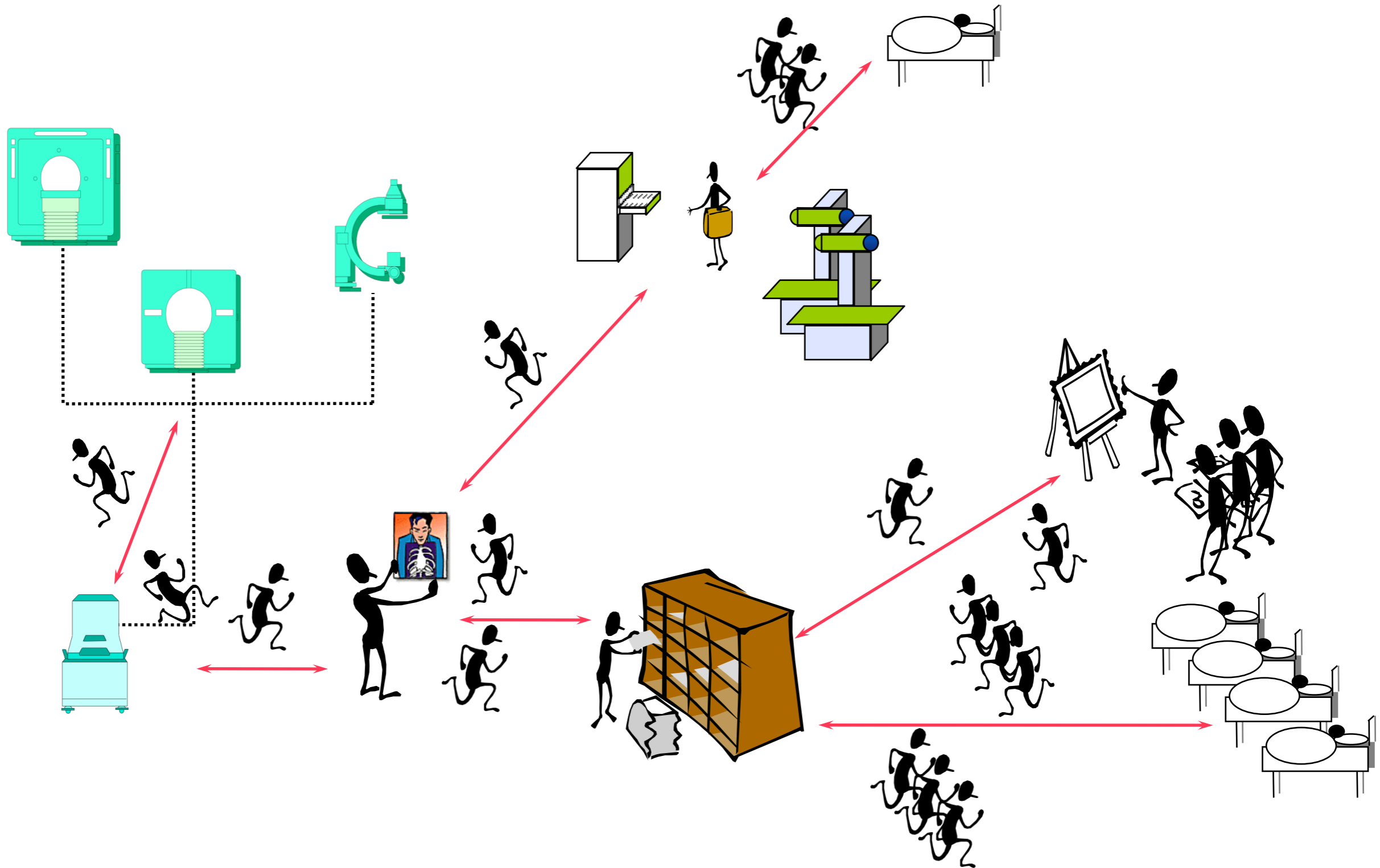


PET - CT up to 4000 slices !

1800 Slices for Functional Analysis



1990s



Radiology 2010 - 2014

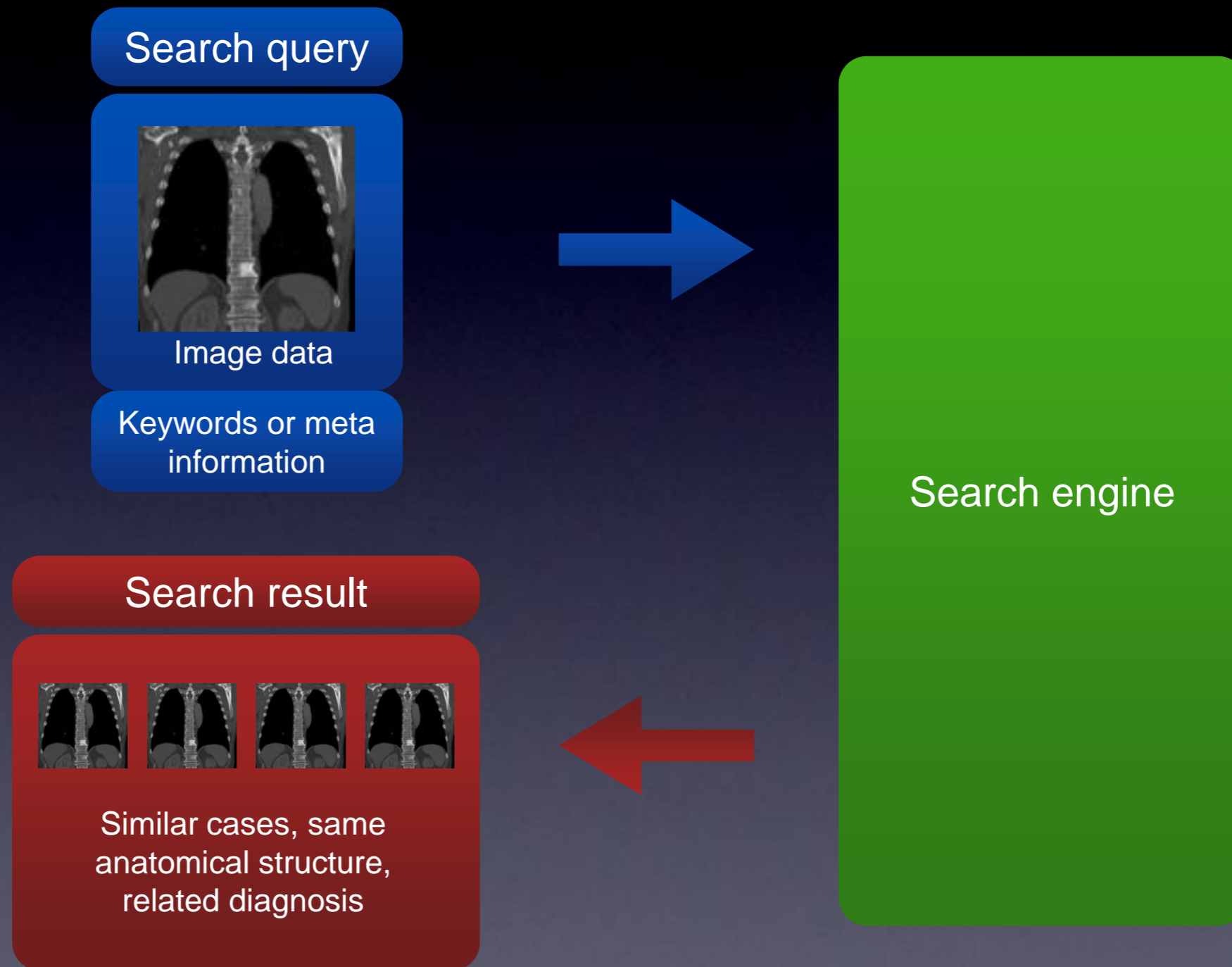
- Massively increasing amount of data
 - information overload of radiologists
 - several 1000 images per day
- Typically used only **once** for diagnosis
 - Waste of knowledge!
 - Why? *Because it is between difficult to impossible to retrieve the relevant of the already existing image data !*



Need

- **Quick and efficient access to relevant data**
 - For training
 - For reference during diagnosis
 - For research
- Index huge amounts of images and corresponding clinical information
- Use the enormous knowledge encoded in every PACS

Use case



Case - Idiopathic Interst. Pneum.

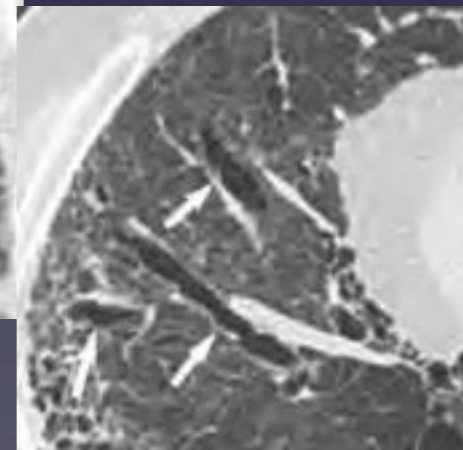
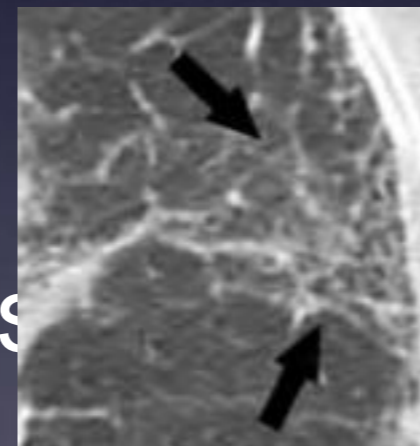
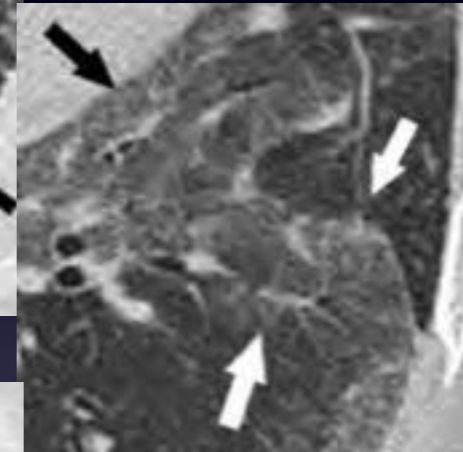
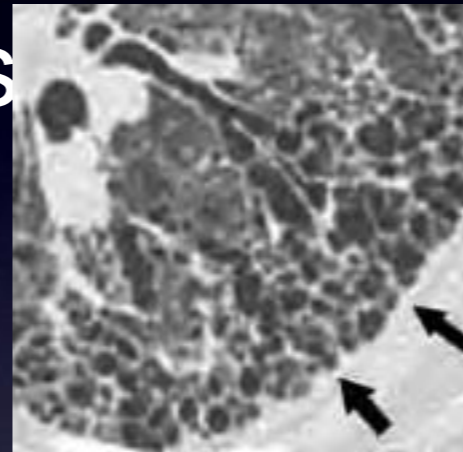
- Texture patterns associated with idiopathic interstitial pneumonias

- honeycombing

- ground-glass

- reticular pattern

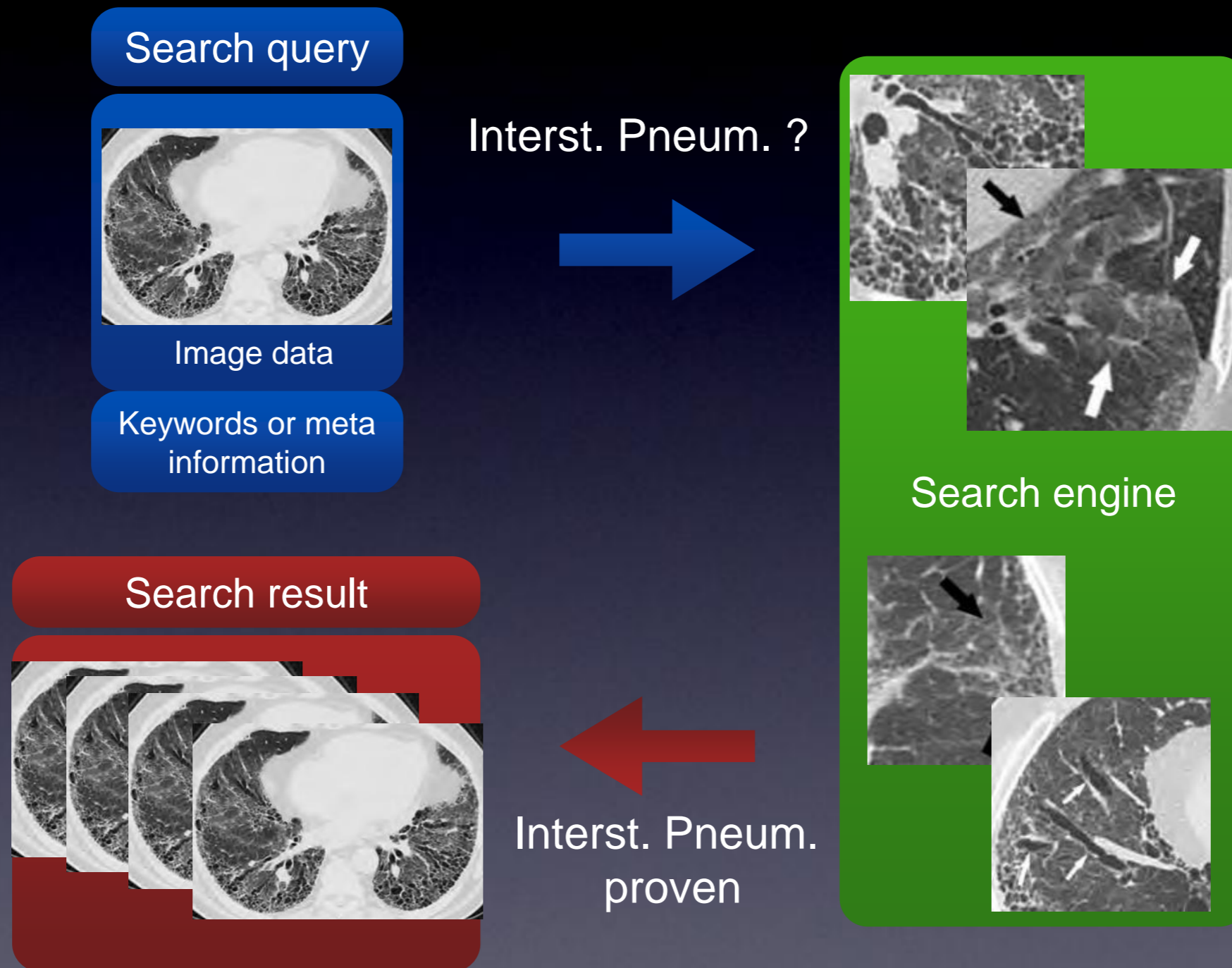
- traction bronchiectasis



Need

- automatically
 - provide similar cases
 - indicate interesting areas
 - pull up / compare clinical data from relevant cases
 - reference to literature

Use case



Implementation

1. Structured interviews with reporting radiologists to evaluate the search behavior
 1. students
 2. residents
 3. experts
2. Data collection and partial annotation
3. Iterative evaluations of search engine by end users, i.e. radiologists

Summary

- Need for efficient access to **relevant** medical imaging data
- Enormous amounts of data available (1000s TB)
- Images + clinical information
- Search query: retrieval of imaging data of related cases based on query case

Questions?

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