

# Deep learning in medical image reconstruction

## Part1: Medical imaging modalities

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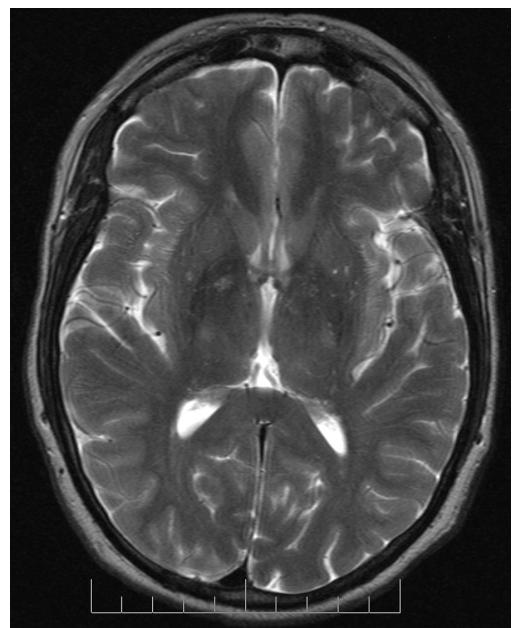
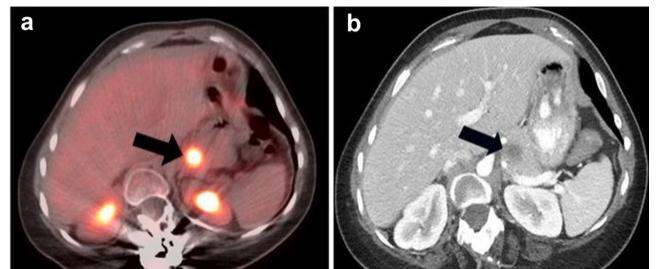


# Medical imaging

Medical imaging is a valuable resource in medicine as it gives the opportunity to see inside the human body. It provides information to understand, model, diagnose, and treat diseases.

Different modalities:

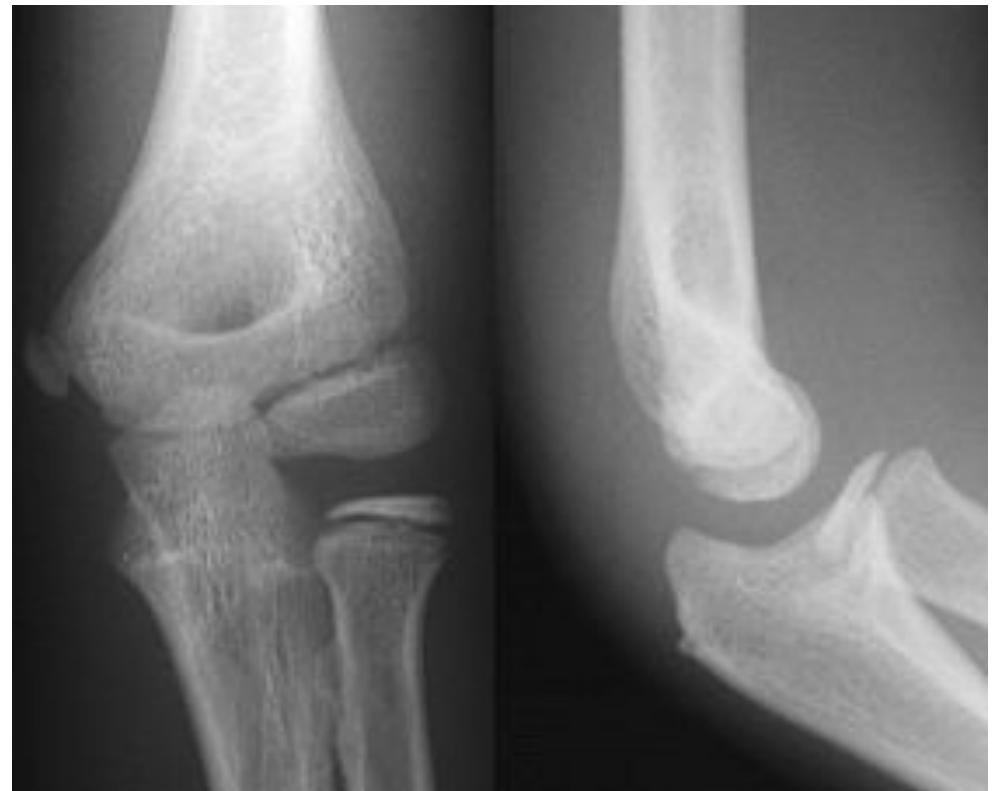
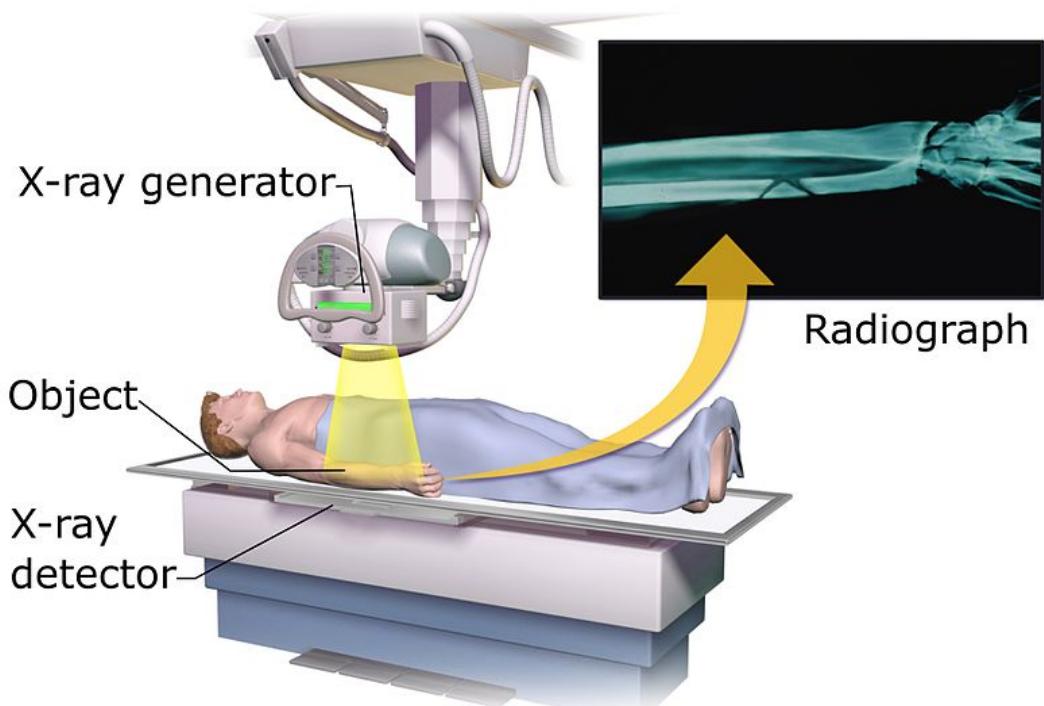
- **Radiography**
- **Computed tomography (CT)**
- **Magnetic resonance imaging (MRI)**
- Ultrasound
- Microscopy
- Etc.



# Radiography

1. Projection radiography
2. Fluoroscopy

## Projectional radiography



# Radiography

1. Projection radiography
2. Fluoroscopy

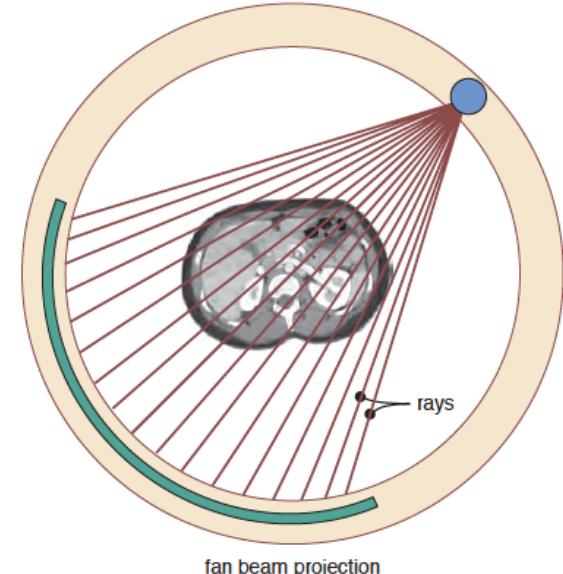
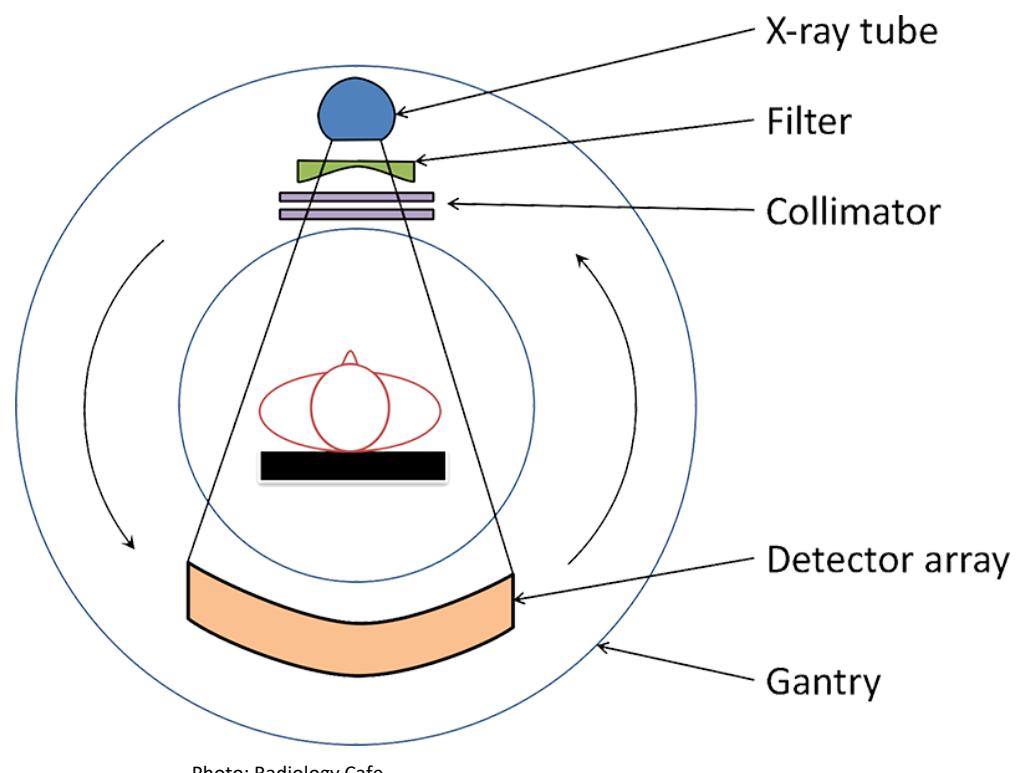


A barium swallow exam taken via fluoroscopy.

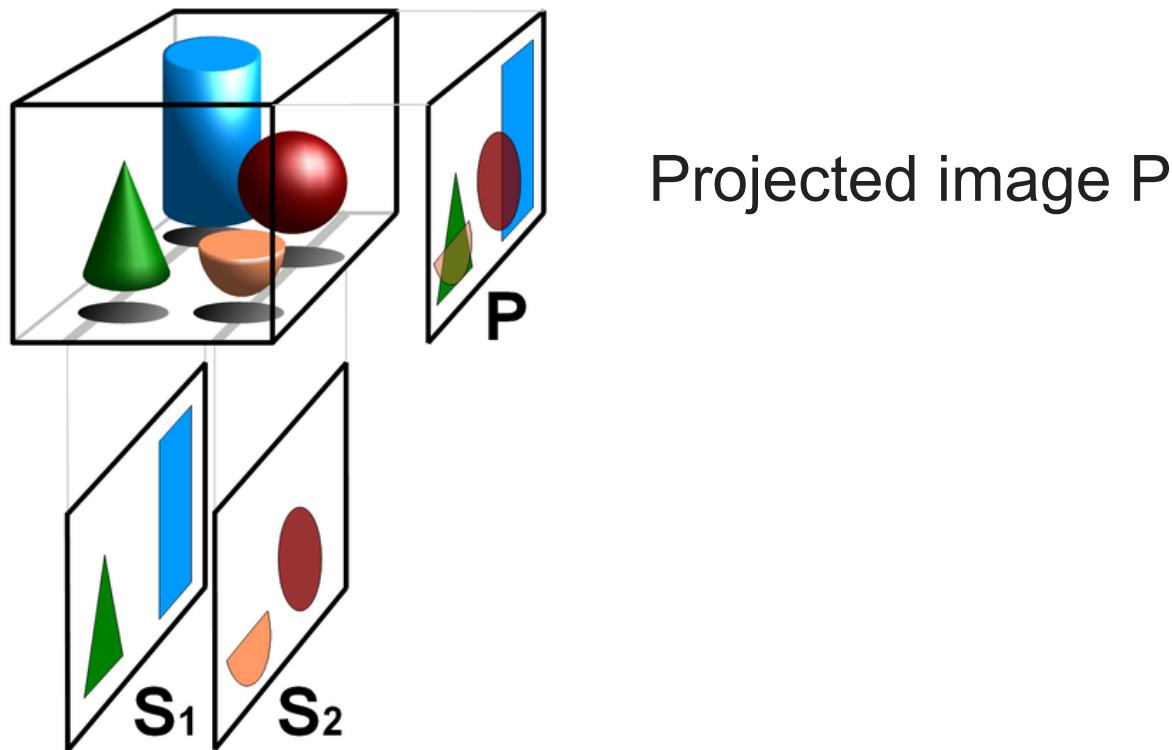


# Computed Tomography (CT)

- Tomography is the imaging by sections or sectioning.



# Tomography vs. Projection radiography

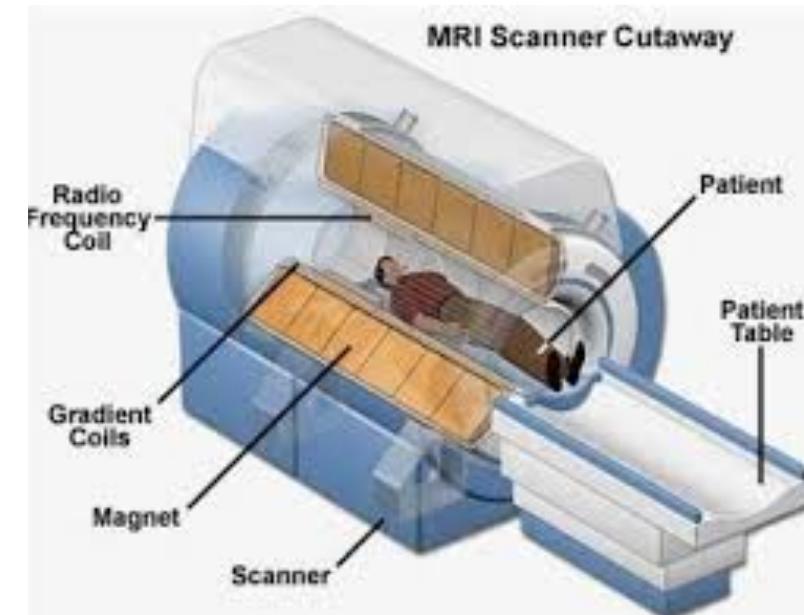
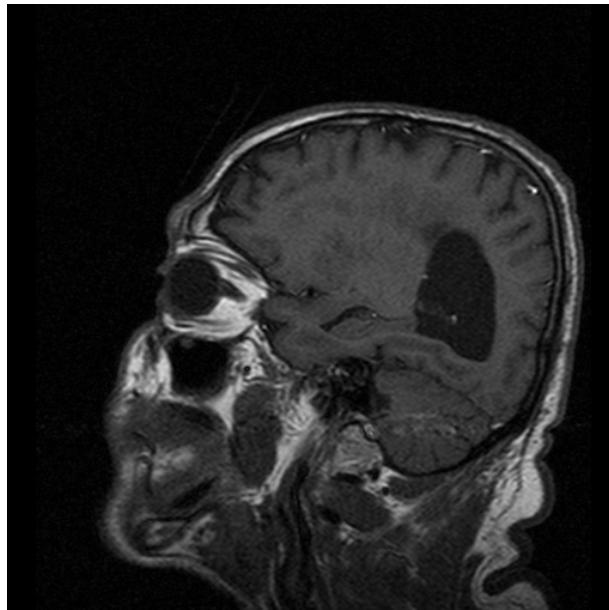


Projected image P

Superposition free tomographic cross sections  
 $S_1$  and  $S_2$  compared with

# Magnetic resonance imaging (MRI)

- Magnetic resonance imaging (MRI) is a medical imaging technique used in radiology to form pictures of the anatomy and the physiological processes of the body.



MRI scanners use strong magnetic fields, magnetic field gradients, and radio waves to generate images of the organs in the body.

# Summary

- Reconstruction algorithms entail transforming signals collected by acquisition hardware into interpretable images. For example:
  - In CT, the image is reconstructed by finding the inverse of the Radon transform, for example using filtered back-projection (FBP).
  - In MRI, the image is reconstructed by using inverse Fourier transform on detected RF signals.

I just need  
the main ideas

