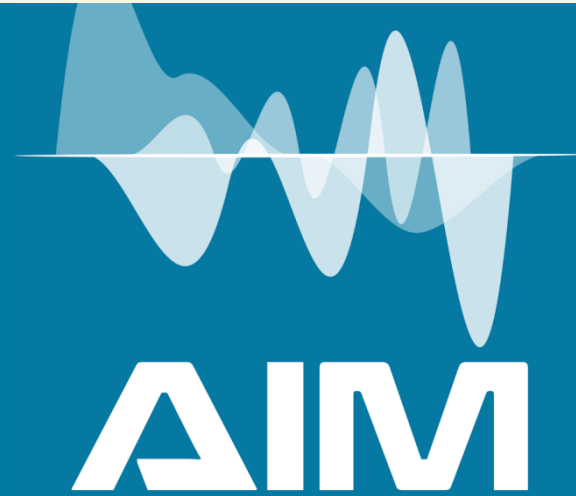


**Artificial
Intelligence in
Medicine**



PROJECT: NEXT AIM

KICK-OFF MEETING

18/02/2022

Nico Curti (UNIBO), **Daniel Remondini** (UNIBO), **Claudia Testa** (UNIBO), **Giovanni
Mettivier** (UNINA), **Roberta Ricciardi** (UNINA), **Daniele Esposito** (UNINA),
Gianfranco Paternò (UNIFE)

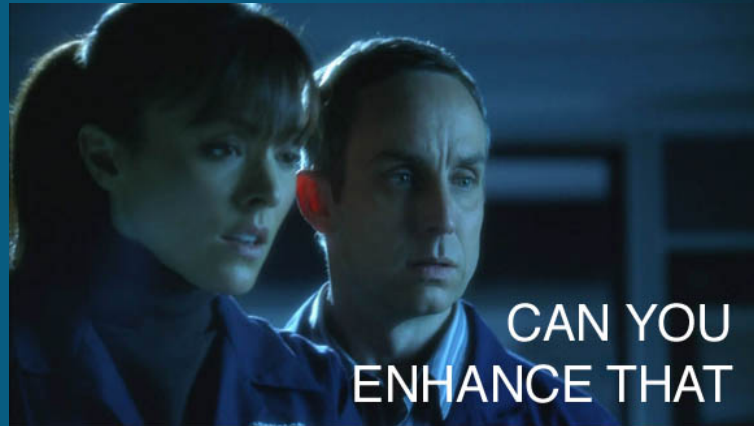
SUPER RESOLUTION IN MEDICAL IMAGES



Purposes:

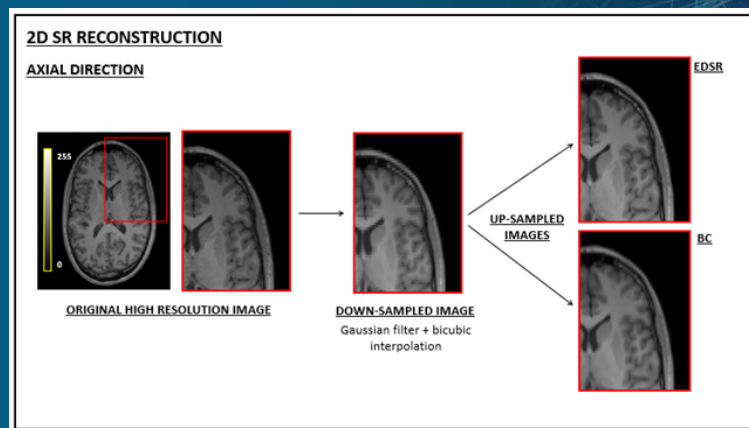
- Improve Medical Image Resolution
- Improve the clinicians' image readability
- Improve the image acquisition time
- Improve object detection algorithms' performances
- Improve features extraction efficiency
- Better appreciate microcalcifications and small areas

SUPER RESOLUTION IN MEDICAL IMAGES



What is Super Resolution?

- Increase spatial resolution via CNN
- Upsample the original image
- It does not affect the image contrast

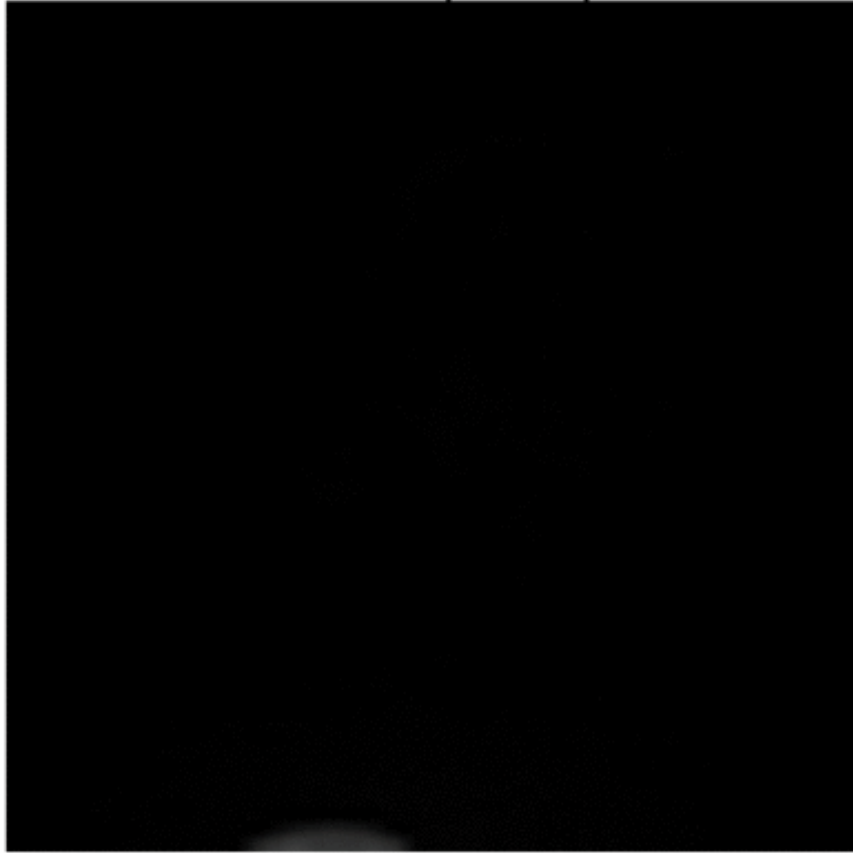


Preliminary works:

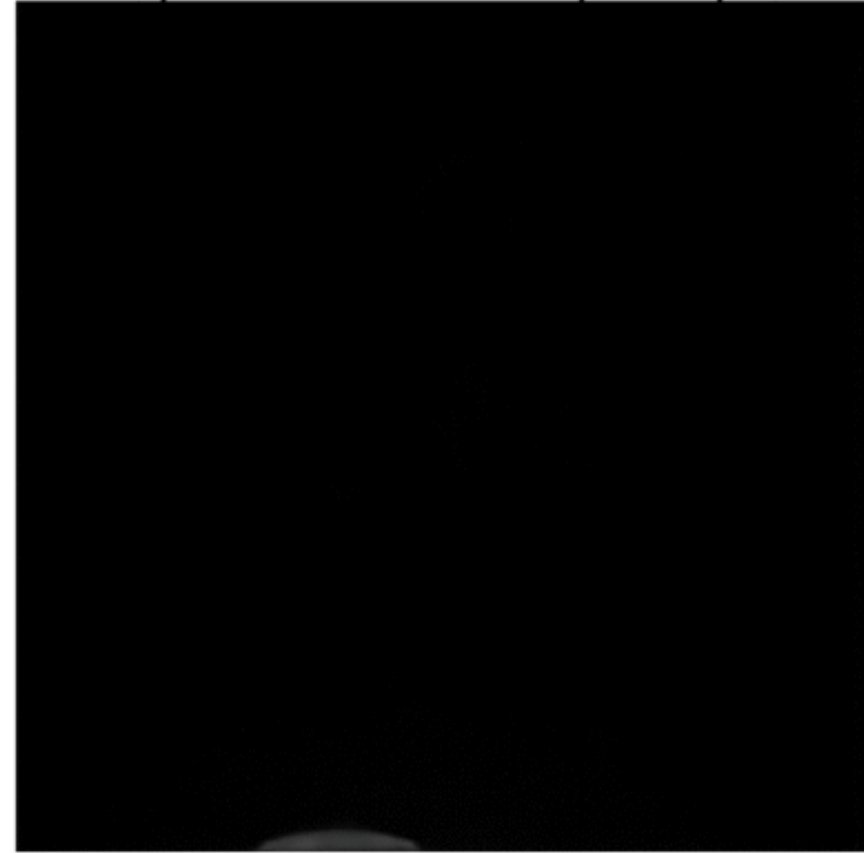
- Implementation of several models
- Natural images training
- Transfer learning to medical images
- Comparison with classical upsampling
- Application to standard DB
- Application to NMR

APPLICATION ON NMR

Bicubic Upsample



Super Resolution Upsample

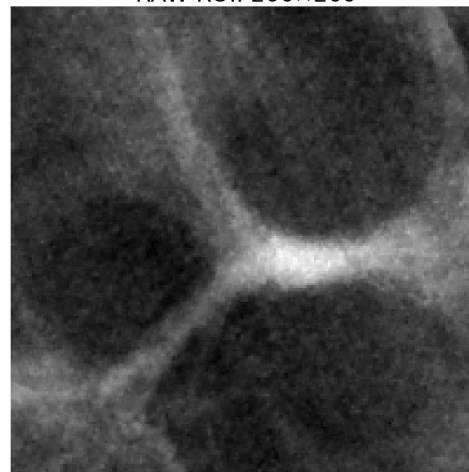


APPLICATION ON MICROCT

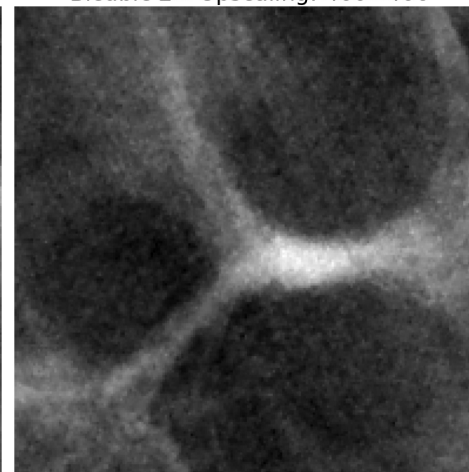
Breast mCT



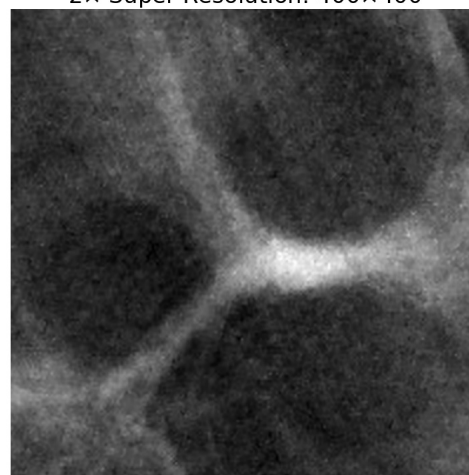
RAW ROI: 200×200



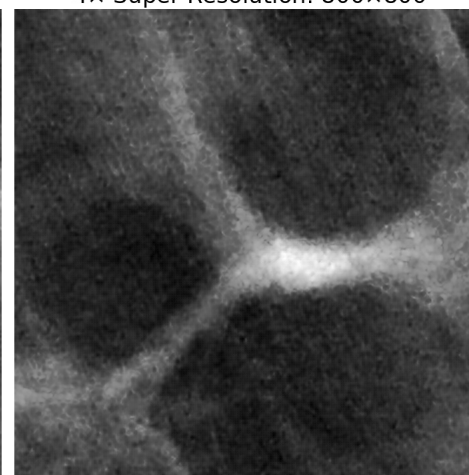
Bicubic 2× Upscaling: 400×400



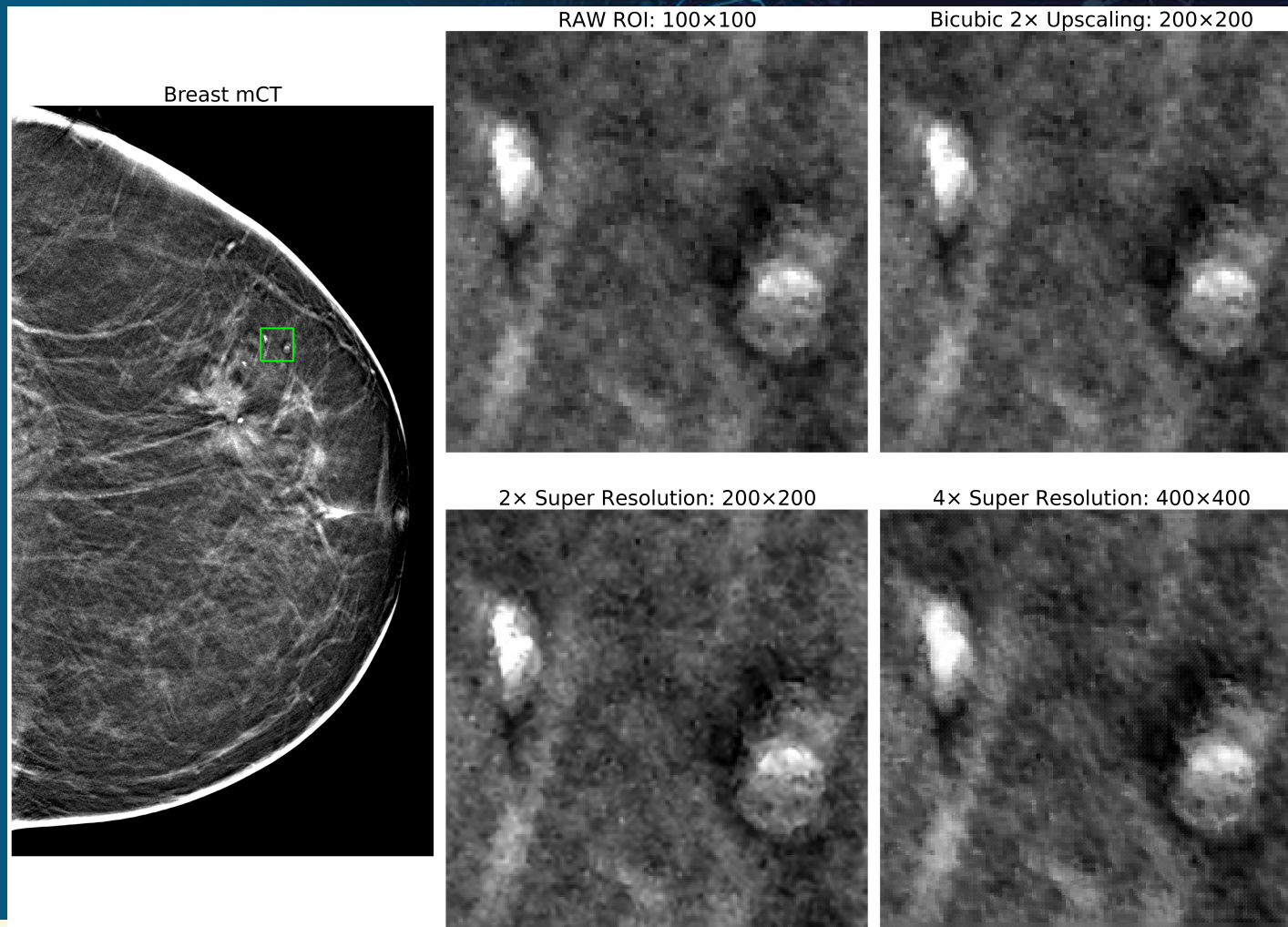
2× Super Resolution: 400×400



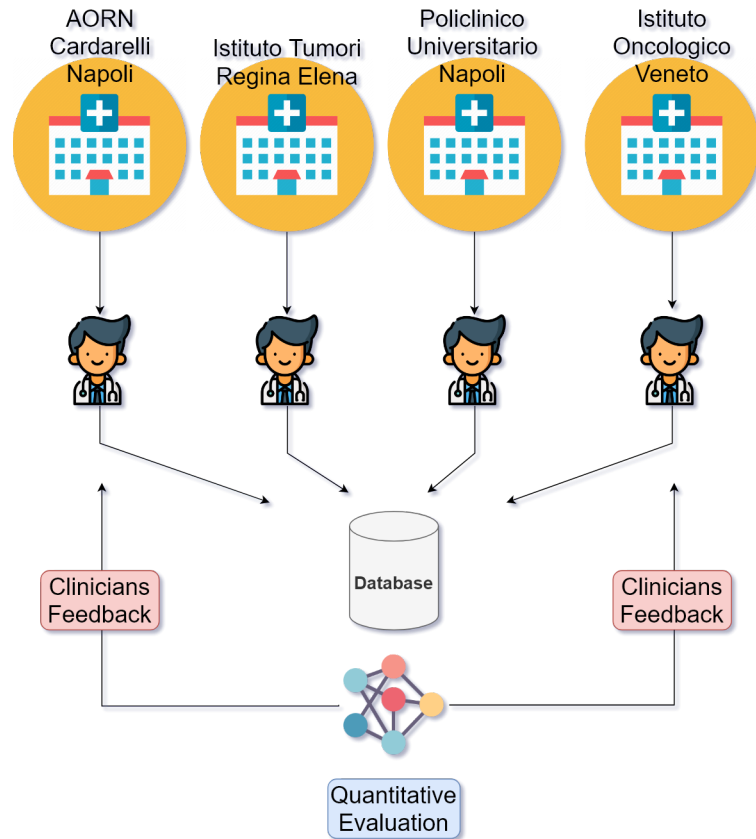
4× Super Resolution: 800×800



APPLICATION ON MICROCT



PROJECT WORKFLOW



- Multi-centre acquisition
- Data harmonization
- Multi-centre evaluation
- Clinicians "harmonization"
- Quantitative evaluation
→ numeric
- Qualitative evaluation
→ clinicians
- Clinicians bias minimization

The background of the slide is a dark blue gradient. Overlaid on this is a complex, abstract network of glowing blue and white lines and dots, resembling a molecular structure or a data network. The dots vary in size and brightness, and the lines connect them in a web-like pattern. A semi-transparent white rectangular box is centered horizontally, containing the text "THANKS FOR YOUR ATTENTION" in a bold, dark blue, sans-serif font.

THANKS FOR YOUR ATTENTION