CAP 5516
Medical Image Computing
(Spring 2022)

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Lecture 15
Course Summary

Great job on the paper presentation!

Final Project Presentation

Schedule

Final Project Presentation Schedule ☆ 🗁 ☁

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	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5
Please write down your name on the selected presentation time slot.					
4/14	Ilkin Sevgi Isler	Michael Fielder	Jacob O'Quinn	Taojiannan Yang	
4/19	Sobha Shanbogue	Ryan Glaspey	Matthew Horvath	Joe Fioresi	Zacchaeus Scheffer
4/21	Joseph Rivera	Crystal Gagne	Nikhil Sreedhar	Md Sanzid Bin	Stephanie Gonzalez
4/28	Sarath Mannam	Wei Fan	Kyle Beggs	Alejandro Zamora	Akashdeep Chakraborty

Final Project Presentation

- 8 mins for presentation and 5 mins for questions

- A summary of your project (10 – 15 slides)
  - Problem definition, motivation (why it is important)
  - Your approach (make it very clear!)
  - Results and comparison
  - Conclusion

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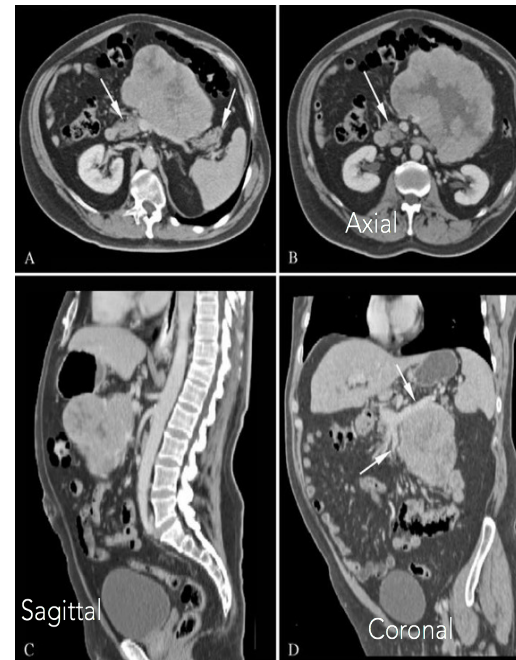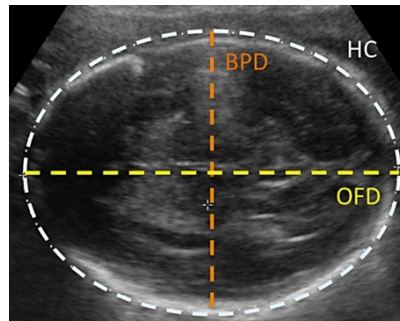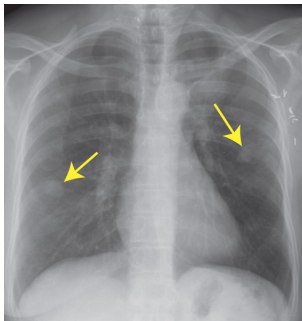
Project Final Report

- You should extend your project milestone to include:
  - The final set of results.
  - Your analysis of those results.
  - Your overall conclusions and findings from the project.

- If you leverage existing source codes, you should
  - Clearly state it in the report
  - Properly credit/cite the original authors (source) in your report and code
  - Identify which part is your own work.
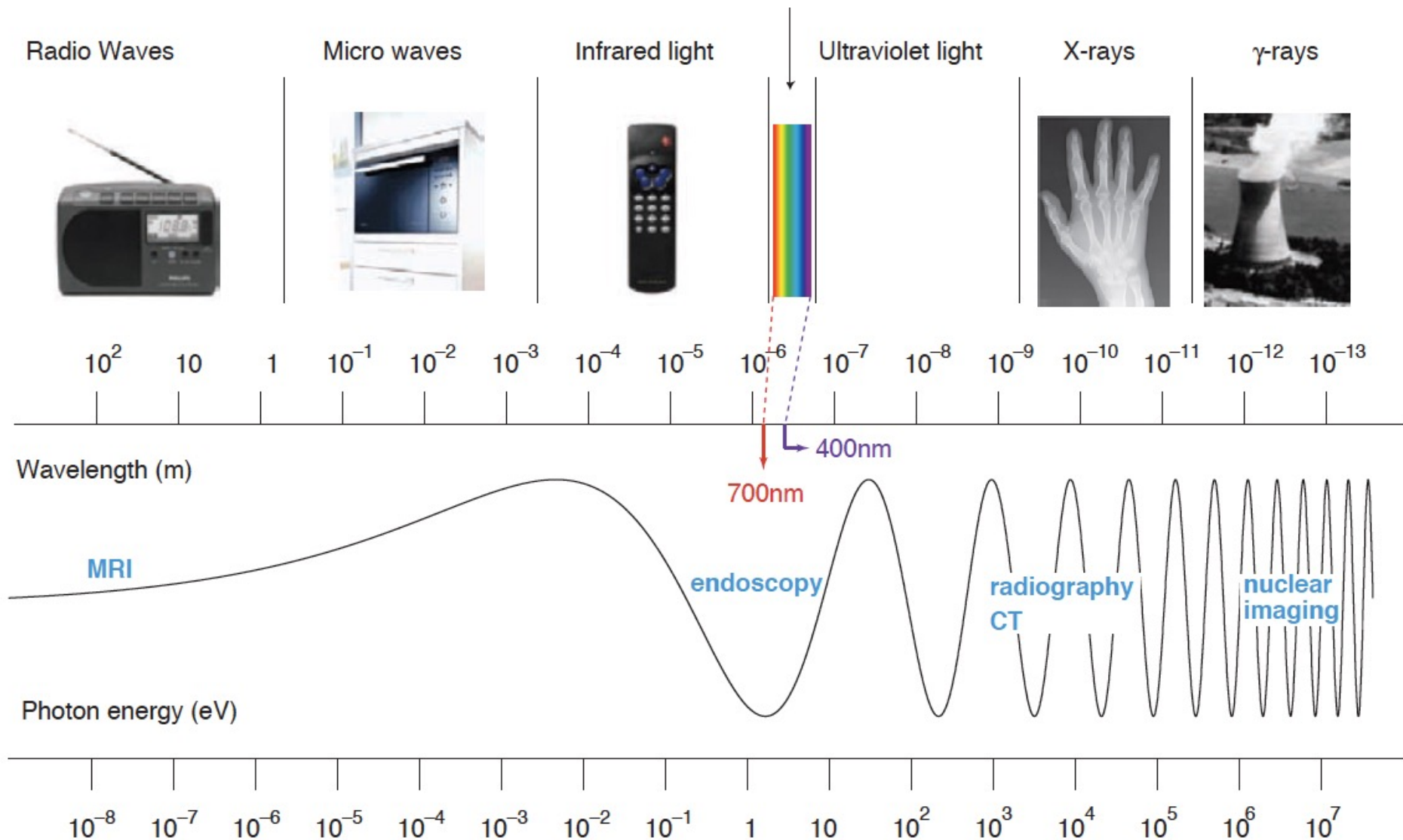
A Brief Summary

Medical Imaging Modality

- **CT** (Computer Tomography)
- **MRI** (Magnetic Resonance Imaging)
- **Ultrasound**
- **X-ray**
- **Nuclear medicine imaging** (including positron-emission tomography (PET))

…

Radio Waves | Micro waves | Infrared light | Ultraviolet light | X-rays | γ-rays

10^2 10 1 10^{-1} 10^{-2} 10^{-3} 10^{-4} 10^{-5} 10^{-6} 10^{-7} 10^{-8} 10^{-9} 10^{-10} 10^{-11} 10^{-12} 10^{-13}

Wavelength (m)

→ 400nm

700nm

MRI

endoscopy

radiography
CT

nuclear
imaging

Photon energy (eV)

10^{-8} 10^{-7} 10^{-6} 10^{-5} 10^{-4} 10^{-3} 10^{-2} 10^{-1} 1 10 10^2 10^3 10^4 10^5 10^6 10^7

ELECTROMAGNETIC SPECTRUM   (P. Suetens)

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Deep Learning (DL) for Medical Image Computing (MIC)

- ## Deep Learning Introduction (a crash course)
    - Fully Connected Feedforward Network
    - Convolutional Neural Networks (CNNs)
    - CNNs Visual Interpretation
    - Recurrent Neural Networks
    - DL training techniques (data augmentation, regularization, transfer learning, etc.)

Deep Learning (DL) for Medical Image Computing (MIC)

- DL for MIC
    - Medical image classification
    - Medical image segmentation
    - GANs for MIC
        - image generation (cross modality), image segmentation, image enhancement, etc.
    - Self-supervised learning
    - Adversarial Robustness
    - Federated Learning and its application in MIC
    - Efficient DL for MIC
        - Efficient network architectures
        - Network pruning
        - Network quantization
        - Knowledge distillation

25th International Conference on Medical Image Computing and Computer Assisted Intervention
September 18–22, 2022
Resorts World Convention Centre Singapore

https://conferences.miccai.org/2022/en/

Medical Imaging with Deep Learning

Zürich, 6 – 8 July 2022

https://2022.midl.io/

IEEE ISBI 2022
International Symposium on Biomedical Imaging
28-31 March 2022, ITC Royal Bengal, Kolkata, India

https://biomedicalimaging.org/2022/

44th Annual International Conference of
the IEEE Engineering in Medicine and Biology Society
11-15 July 2022   Glasgow, Scotland, UK

https://embc.embs.org/2022/

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Open Discussion

Final Project
Q&A