AI 619 **Fall 2024**
Professor: Jong Chul Ye
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AI619 AI for Medical Imaging and Signals

Synopsis

The goal of this course is to learn and implement artificial intelligence technologies used in modern medical imaging and bio-signal analysis. Students learn the physis of medical imaging and signal modality such as X-ray, CT, MRI, Ultrasound, EKG, and learn the latest neura approaches to design classifier, segmentation, registration, reconstruction, and etc., which are the main research topics in AI in healthcares.

Credit

3 units (3:0:3)

Prerequisite (Important)

AI501, AI 502, Experiences with Pytorch or Tensorflow

Grading Attendance (10%), Mid-Term Project (45%) Term project (45%)

Office Hours After the class hours or determined by appointment
TA TBA

Textbook: Class handouts, additional reading materials

AI for Medical Imaging and Signals

Course Syllabus

Week	Contents
1	X-ray Physics and Medical Applications
2	CXR Classification with AI
3	Physics of X-ray Computed Tomgraphy
4	2D Reconstruction Algorithm (Filtered Backprojection)
5	3D Reconstuction Algorithm (FDK, Backprojection Filteration)
6	CT Segmentation and Registration using AI
7	CT Artififact Removal using AI
8	Midterm Project Presentation
9	Physics of MRI
10	
11	Accelerated MRI Reconstruction using AI
12	Ultrasound Physics
13	Beamforming using AI
14	EKG Physics
15	Foundation model for EKG
16	Final Term Project Presentation