In the last a few years, diagnostic medical imaging has emerged as one of the most promising areas of healthcare innovation that artificial intelligence (AI) has clinical applications, including image processing and interpretation. AI is in general a technology involving computer science application in creating systems for tasks typically require human intelligence, and the term AI is also used when a technology simulates cognitive functions such as learning and problem solving. Machine learning (ML) is a subfield of AI involving all approaches that allow computers to learn from data without explicit programming, it utilizes computational models and algorithms mimicking the architecture of biological neural network in brain, which is defined as artificial neural network (ANN). When ML is used in medical imaging, it is narrowed to recognize patterns in imaging by using many example images to find the pattern with computer algorithms. On the other hand, deep learning (DL) is part of ML representing a branch of existing AI techniques. DL uses neural networks with many layers, and convolutional neural networks (CNNs) are common DL architectures for images, especially for image classification tasks.

Current and potential AI applications in diagnostic radiology may include improving image quality, reducing radiation dose, decreasing MRI imaging time, enhancing technical protocols, faster and standardized detection and characterization of image findings, and workflow improvement. With an ever increasing amount of data and the potential use of AI, higher efficiency in diagnostic radiology will be available in the near future.

Learning objectives:
1. Understand the basics concepts of Artificial Intelligence (AI) and it’s relation with Machine Learning (ML) and Deep Learning (DL)
2. Understand primary components of DL architectures and neural network.
3. Understand selected AI applications in diagnostic radiology.

References: