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Lecture 1: Popular Classics in Machine Learning for Medical Imaging

Deep learning dominates recent machine learning in medical imaging literature but we should not forget that there may be cases where other machine learning methods may be more appropriate and give better results. This introductory lecture will provide a tutorial on classic machine learning including support vector machines (SVMs), kernel-based techniques, and boosting techniques and discusses how they have influenced the medical image analysis field over recent years.

Lecture 2: Learning to interpret Ultrasound Imaging

The acoustic patterns in ultrasound images contain rich information for clinical-decision making. However, from an image analysis perspective ultrasound is considered one of the hardest medical imaging modalities to work with due to the appearance being so different from MR/CT anatomical imaging and natural images, and the subjectivity of acquisition. Modern machine learning frameworks for interpreting images and video interpreting are well-suited to this imaging modality, and perhaps unsurprisingly their application is starting to transform thinking on how to automate analysis of ultrasound data.

In this talk I will describe some of my groups inter-disciplinary research on machine learning applied to ultrasound. Challenges relate in part to how to automate detection and diagnostic measurement in data of variable quality typical of real world clinical use, but perhaps more scientifically interesting, how to design computer algorithms to recover biomarkers hidden within acoustic patterns that are difficult to perceive by the radiologists eye.