THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Machine Learning in Biomedical Engineering

BIOMEDE 5710

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
The goal of this course is to introduce ML and apply basic ML techniques to biomedical engineering applications. This course is intended for BME undergraduates and graduate students with limited exposure to ML basics.

Prerequisites and Co-requisites:
Senior or graduate standing in BME or College of Medicine, or permission of instructor

Course Goals / Objectives:
- Recognize BME applications that can benefit from ML methods
- Upload, manipulate, and display data from various biomedical applications
- Understand NN basics, including loss function, activation function, and backpropagation
- Formulate, implement, and apply supervised ML techniques, including classification, regression, and segmentation, to biomedical applications
- Formulate, implement, and apply sequence modeling techniques to biomedical applications
- Formulate, implement and apply clustering and dimensionality reduction techniques to biomedical applications
- Recognize ethics of biomedical applications of ML and identify emerging paradigms

Course Topics:
- Introduction, terminology, setting up Anaconda
- pandas, NumPy, scikit-learn
- Linear and Multiple Regressions
- Logistic Regression
- Regression/Classification with NN
- CNN and Image Processing
- Sequence Modeling
- RNN and LSTM
- Unsupervised Learning
- Ethics in ML and Advanced Topics

Designation:
Elective