

CS6208 : Advanced Topics in Artificial Intelligence

Graph Machine Learning

Administrative (Week 5)

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Outline

- This course focuses on the foundations of graph machine learning (GML).
- The course has three main parts
 - Part 1 : GML without feature learning (before 2014)
 - Part 2 : GML with shallow feature learning (2014-2016)
 - Part 3 : GML with deep feature learning, a.k.a. Graph Neural Networks (after 2016)

Tentative Lectures

- Introduction to Graph Deep Learning
- Part 1: GML without feature learning (before 2014)
 - Introduction to Graph Science
 - Graph Analysis Techniques without Feature Learning
 - Graph clustering
 - • Classification
 - Recommendation
 - Dimensionality reduction
- Part 2 : GML with shallow feature learning (2014-2016)
 - Shallow graph feature learning
- Part 3 : GML with deep feature learning, a.k.a. GNNs (after 2016)
 - Graph Convolutional Networks (spectral and spatial)
 - Benchmarking GNNs
 - Graph Positional Encoding
 - Graph ViT/MLP-Mixer
 - Generative GNNs and molecular science
 - Combinatorial optimization
 - GNNs for Recommendation
 - GNNs for knowledge graphs
 - Theory of GNNs



Questions?