

CS 249: GRAPH NEURAL NETWORKS

1: Introduction

Instructor: Yizhou Sun

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Instructor

- Yizhou Sun
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 - <http://web.cs.ucla.edu/~yzsun/>
 - BH3531F
- Research areas
 - graph mining, social/information network mining, text mining, web mining
 - Data mining, machine learning
- Office hour
 - Tuesdays 3:30-5pm

Logistics of the Course

- Grading
 - Participation: 5%
 - Homework: 30%
 - Paper presentation: 25%
 - Group-based
 - Course project: 40%
 - Group-based

Lectures

- Part I: Lectures by the instructor (2 weeks)
 - Cover the basic materials
- Part II: paper presentation by students (7 weeks)
 - Extended materials, which require in-depth reading of papers
- Part III: course project presentation (Week 10)
 - Survey or a research project related to GNNs

Homework

- A quiz style homework for each paper, due every lecture in Part II
 - The paper presenters are in charge of homework question, solution, and discussion, which is expected to finish in class

Paper Presentation

- What to present
 - Each student sign-up for one group of research papers
 - Every group can be signed by maximum 4 students
 - 14 papers, maximum 56 students
- How long for each presentation?
 - 1 entire lecture, including Q&A, homework time, and homework discussion
- When to present
 - From Week 3 to Week 9
- How to present
 - Make slides, when necessary, using whiteboard
- What else?
 - Design an in-class homework with 3 well designed questions
 - Post the slides to GitHub the day before the lecture
 - Provide me the homework with correct answers, so I can upload them to BruinLearn.

Course Project

- A survey paper or a Research project
 - Survey paper: GNN on KGs, Graph synthesis, GNN for programming language, GNN interpretability, Robust GNN, scalability, GNN for combinatorial problems, etc..
 - Research project: a GNN related research project and write a report that is potentially submitted to some venue for publication
 - You will have chance to work with my PhD students for projects defined by them
 - Teamwork
 - 3-4 people per group
- Timeline
 - Team formation due date: Week 2
 - Proposal due date: Week 4
 - Presentation: 5/31 and 6/2 (10-12pm)
 - Final report due date: 6/5/2022
 - What to submit: project report and code in your GitHub repo and link it to the course repo

Content

- Graph basics
 - Introduction to graphs
 - Graph learning
 - Shallow embedding
 - Knowledge Graph Embedding
 - GCN and its variants
- GNNs
 - Deep Geometric Learning
 - Dynamical Systems and Physical Simulators
 - Causal Representation Learning
 - Logic and Neural Symbolic Reasoning
 - Applications to Programming Languages

A Collaborative Course

- GitHub Repo
 - https://github.com/yichousun/Spring2022_CS249_GNN
 - Everyone in the class will be a contributor
 - Please create your own repo for course project and link it back to the main project
 - The repo will become a legacy
 - Let me know if you have any ideas to make it better