

CS 249: GRAPH NEURAL NETWORKS

1: Introduction

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January 5, 2021

Instructor

- Yizhou Sun
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 - <http://web.cs.ucla.edu/~yzsun/>
- Research areas
 - graph mining, social/information network mining, text mining, web mining
 - Data mining, machine learning
- Office hour
 - Fridays 1-2pm

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 (1.5 weeks)
 - Cover the basic materials
- Part II: paper presentation by students (7.5 weeks)
 - Extended materials, which require in-depth reading of papers
 - 2 Guest lectures given by authors of the selected 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
 - To accommodate different time zone
 - Within 24 hours

Paper Presentation

- What to present
 - Each student sign-up for one group of research papers
 - Every group can be signed by around 2-3 students
 - 13 papers, ~35 students
- How long for each presentation?
 - 1 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 a in-class homework with 3 well designed questions
 - Post the slides and homework (with correct answer) to GitHub the day before the lecture
 - Provide the feedback to the solution in the quiz automatically

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
 - Teamwork
 - 3-4 people per group
- Timeline
 - Team formation due date: Week 2
 - Proposal due date: Week 4
 - Presentation: 3/9 and 3/11 (10-12pm)
 - Final report due date: 3/12/2020
 - 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
 - GCN and its variants
- GNN
 - GNNs on Heterogeneous network
 - Applications
 - GNNs for Knowledge Graphs
 - GNNs for dynamic systems
 - GNNs for Programming Language
 - Graph synthesis
 - Expressiveness of GNNs

A Collaborative Course

- GitHub Repo
 - https://github.com/yichousun/Winter2021_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