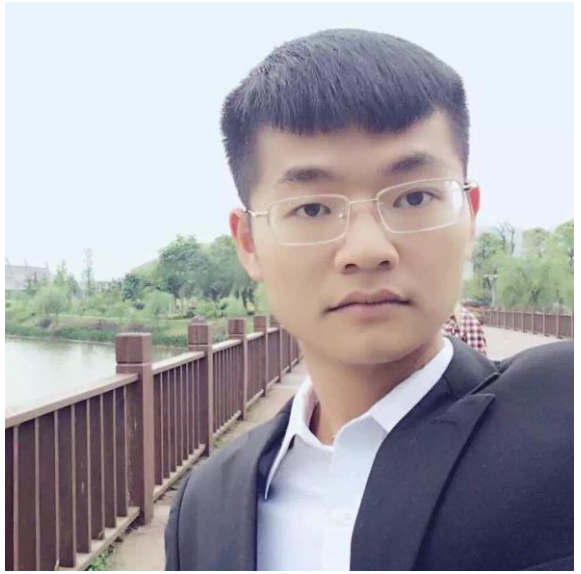
Introduction Lecture

Seminar – Deep Learning in Physics

29th March 2021

About us

Liwei Chen



You Xie

Nilam Tathawadekar

About this seminar

- Recent research in physics based deep learning methods
  - ❑ Be familiar with the basics of machine learning
  - ❑ Know about the structure of neural networks
- Independent investigations
  - ❑ Critical analysis and evaluation of the topic and related work
- Develop writing and presentation skills

Report

- Maximum 4 pages excluding references
- ACM SIGGRAPH TOG format (acmtog) → precompiled latex template
- Due two weeks before your talk (Monday by 23:59)

- Guidelines
  - ❑ Summary of the paper
  - ❑ Add own reasoning about the work
  - ❑ e.g. comparisons, pros and cons, limitations, possible future work

Slides

- Any slide layout you like, prepare slides as PDF
  - ❑ Ensure readability (colors, images and font size)
  - ❑ Avoid using too much text
- Send semi-final slides one week before your talk, otherwise talk will be cancelled
  - ❑ We will take a look and give feedback
  - ❑ Revise slides until presentation
- Send final slides and final report after your presentation

Presentation

- Present your topic in English
- 30 minutes of presentation
- 10 minutes of discussion
- Actively participate in discussion for other presentations

Presentation

- Be ready in advance
  - ❑ Online talks are different to presentations in person
  - ❑ Upload slides in PDF format to BigBlueButton (BBB) when presenting
  - ❑ Be early in BBB room since upload might take some time
  - ❑ Show videos in local player or with BBB video option (requires a YouTube or Vimeo link)
- Avoid distractions and background noise when presenting

- TUMonline registration will happen automatically eventually, no manual registration required
- Advisor
  - ❑ Contact any time you have questions related to the seminar or your paper
  - ❑ Feedback for semi-final slides (and semi-final report if you want)

- Attendance
  - ❑ Missing up to two talks is allowed, if you let us know in advance and write a short summary of the paper (~ 1 page) in your own words
  - ❑ Missing a third one means failing the seminar (special rules for severe issues as appropriate)

Presentation Date	Presenter	Topic	Advisor
10.05	Yuanhao Zhong	Hamiltonian Neural Networks	Nilam T
10.05	Ashwanth Ramesh	Machine learning accelerated computational fluid dynamics	You Xie
17.05	Daniel Ziese	Solver-in-the-Loop: Learning from Differentiable Physics to Interact with Iterative PDE-Solvers	Liwei Chen
17.05	Xingzhuo Yan	Learning data-driven discretizations for partial differential equations	You Xie
31.05	Wing To Ku	Learning to control PDEs with differentiable physics	Liwei Chen
31.05	Arian Bajrami	Discovering physical concepts with neural networks	Nilam T
7.06	Tapish Narwal	Neural Ordinary Differential Equations	Liwei Chen
7.06	Karan Shah	Deep learning and the Schrödinger equation	Nilam T
14.06	Chenqi Zhou	Data-driven medium-range weather prediction with a Resnet pretrained on climate simulations: A new model for WeatherBench	You Xie
14.06	Carlos Adrian Salas Cedillo	Data-driven nonlinear aeroelastic models of morphing wings for control	Liwei Chen
21.06	Yujun Liu	tempoGAN: A Temporally Coherent, Volumetric GAN for Super-resolution Fluid Flow	You Xie
21.06	Abdelrahman Amer	Solving high-dimensional partial differential equations using deep learning	Nilam T
28.06	Eva Winker	Transfer learning for nonlinear dynamics and its application to fluid turbulence	Liwei Chen
28.06	Christina Nuss-Brill	Deep learning methods for super-resolution reconstruction of turbulent flows	Nilam T

Any questions?