

ANKITH MOHAN

ankithmo@vt.edu ◇ ankith-mohan.github.io ◇

EDUCATION

PhD in Computer Science

2021 - 2026 (expected)

Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

Advisor: Jamie Sikora

MS in Computer Science

2018 - 2020

University of Southern California, Los Angeles, CA, USA

Advisors: Aiichiro Nakano and Emilio Ferrara

Thesis: Alleviating the Noisy Data Problem using Restricted Boltzmann Machines

BE in Information Science and Engineering

2012 - 2016

Ramaiah Institute of Technology, Bengaluru, India

EXPERIENCE

University of Southern California

2018 - 2020

Research Assistant

Los Angeles, CA

Advisor: Sze-Chuan Suen

- Researched on techniques to model the effectiveness of *Pre-exposure prophylaxis* (PrEP) on HIV/AIDS outcomes in Los Angeles county.
- Developed interactive web application that allows online modeling of HIV/AIDS outcomes.
- Designed end-to-end deep learning pipeline to predict mortality of patients at Sutter Health based on patient characteristics, vitals, labs and interventions.

Information Sciences Institute

January - May, 2019

Directed Research Assistant

Marina Del Rey, CA

Advisors: Robert F Lucas and Jeremy Liu

- Modeled large-scale reactive molecular dynamics (RMD) simulations data set of MoS_2 monolayer to be able to denoise grain boundaries and defects.
- Used restricted Boltzmann machines (RBM) and limited Boltzmann machines (LBM) which was sampled using D-Wave adiabatic quantum annealer (AQA).
- Improved the performance of the LBM by finding techniques to efficiently reassign its hidden units to the qubits of AQA.

Indian Statistical Institute Bangalore Center

2017 - 2018

Research Assistant

Bengaluru, India

Advisor: Saroj Kumar Meher

- Conducted exploratory research on techniques to model geological data using fuzzy neural network and other deep learning models.

Ramaiah Institute of Technology

2016 - 2018

Research Associate

Bengaluru, India

Advisor: Krishnaraj P.M.

- Improved the performance of existing methods to identify influentials in a social network using several unsupervised and statistical machine learning approaches.
- Responsible for successful organization of the materials for a book on social network analysis focusing on the practical applications of several theoretical concepts.

JOURNAL ARTICLES

Ankith Mohan, Aiichiro Nakano, Emilio Ferrara. “Graph signal recovery using restricted Boltzmann machines”. *Expert Systems with Applications* (2020) (under review)

Jeremy Liu, **Ankith Mohan**, Rajiv K. Kalia, Aiichiro Nakano, Ken-ichi Nomura, Priya Vashishta, and Ke-Thia Yao. “Boltzmann machine modeling of layered MoS₂ synthesis on a quantum annealer”. *Computational Materials Science* 173 (2020): 109429.

Krishnaraj P. M., **Ankith Mohan**, and Srinivasa K.G. “Performance of procedures for identifying influentials in a social network: prediction of time and memory usage as a function of network properties”. *Social Network Analysis and Mining* 7, no. 1 (2017): 34.

TEXTBOOK

Krishnaraj P.M., **Ankith Mohan**, and Srinivasa K.G. *Practical Social Network Analysis with Python*. Springer International Publishing, 2018.

OPEN-SOURCE PROJECTS

denoiseRBM <https://github.com/ankithmo/denoiseRBM>

- Model-agnostic pipeline to recover graph signals by exploiting content-addressable memory property of RBM and the hidden layer representations of a deep neural network (DNN).
- Pipeline can be used for any dataset but is particularly effective for graph-structured datasets.
- Requires the deep neural network to be trained on *clean* data, data which is free of noise.

estimateMI <https://github.com/ankithmo/estimateMI>

- Implementation of Ziv Goldfeld, Kristjan Greenewald, Yury Polyanskiy. (2019) “Estimating Differential Entropy under Gaussian Convolutions”.
- Estimating the mutual information between the input layer and each of the hidden layer representations using a *noisy* DNN, where additive white Gaussian noise (AWGN) is injected to each of these representations.
- Extending the work to estimate information flow in graph neural networks.

Deep Pommerman <https://deep-agents.github.io/>

- Solving the game of Pommerman using deep reinforcement learning.
- Cooperated with five teammates to design both curriculum learning and reward engineering methods to progressively train the game agent.
- Trained agents that used imitation learning or Monte Carlo tree search methods to track and eliminate opponent agents.

SKILLS

Languages

Python, R, Matlab, C++

Libraries

Deep learning: PyTorch, Tensorflow

Geometric deep learning: PyTorch geometric, Deep Graph Library, Graph Nets

Quantum computing: Ocean, Qiskit

Visualization: Dash, R Shiny