Sudhanshu (Dan) Chanpuriya

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EDUCATION

University of Masachusetts Amherst   Amherst, MA
M.S./Ph.D. in Computer Science, Advisor: Cameron Musco   *2018–Present*

Dartmouth College   Hanover, NH
B.S. in Computer Science, B.S. in Engineering Physics, Minor in Mathematics   *2014–2018*

RESEARCH INTERESTS

I am broadly interested in machine learning involving network data and graph-based algorithms. My recent work centers around learning or inverting low-dimensional, continuous representations for networks. I am more generally interested in connections between recent, "deep" methods and classical methods and how these connections can inform theoretical understanding of deep learning as well as new simplifications and advancements.

PROJECTS

Network Embeddings for Downstream Tasks and Reconstruction   *2019–Present*
Research Assistant to Prof. Cameron Musco

- Derived new expressions for the DeepWalk objective in the infinite window-size limit, showing equivalency to classical spectral embedding. Showed that addition of a simple nonlinearity to spectral embedding approximates DeepWalk and evaluated the performance of this approximation on node classification for real-world networks.
- Responding to prior working showing that node embeddings fail to capture local network structure under certain assumptions, applied a logistic PCA algorithm which, under a slight relaxation of those assumptions, demonstrated exact low-dimensional factorization of several real-world networks.

Adversarial Machine Learning for Malware Identification   *Jan. 2018–Jun. 2018*
Dartmouth Leave Term Grant / Senior Honors Thesis with Prof. V.S. Subrahmanian.

- Created and evaluated a genetic algorithm for data poisoning attacks on black-box classifiers.

DG Schemes with L1 Regularization in Hyperbolic PDE Solvers   *Jun. 2017–Oct. 2017*
Dartmouth Leave Term Grant with Prof. Anne Gelb.

- Extended then-recent research on regularization-based shock stabilization schemes used to enhance finite difference and spectral methods. Implemented and evaluated enhanced discontinuous Galerkin (DG) methods on discontinuous fluid dynamics test problems.

Plot Structure Characterization and Visualization Using Subtitle Files   *Jun. 2016–Sep. 2016*
Neukom Scholars Grant with Prof. Allen Riddell.

- Processed subtitle files of television shows to extract n-grams which are semantically characteristic to parts of episodes. Created continuous visualizations of n-gram frequency distributions across parts of episodes and series release period using KDE.

Publications

1. **InfiniteWalk: Deep Network Embeddings as Laplacian Embeddings with a Nonlinearity**
   Sudhanshu Chanpuriya and Cameron Musco. *Knowledge Discovery in Databases (KDD)*, 2020.

2. **Node Embeddings and Exact Low-Rank Representations of Complex Networks**
   Sudhanshu Chanpuriya, Cameron Musco, Konstantinos Sotiropoulos, and Charalampos Tsourakakis. In submission.

Teaching

- **Teaching Assistant** at UMass Amherst   *Fall 2018–Present*
  Computer Systems Principles (COMPSCI 230)

- **Teaching Assistant** at UMass Amherst   *Summer 2019*
  Introduction to Structured Query Language (COMPSCI 197Q)