



Education

Georgia Institute of Technology

 Ph.D. in Computational Science and Engineering

 M.S. in Computational Science and Engineering

> GPA: 3.91/4.0

> Advisor: Prof. Duen Horng Chau


> Research concentration: Adversarial ML, ML security, Explainability and Interpretability in Deep Learning

2015 - present

currently pursuing

Fall 2015 - Spring 2017

Netaji Subhas Institute of Technology, University of Delhi

 B.E. in Instrumentation and Control Engineering

> Thesis: Automatic Speaker Recognition using Student's T-Mixture Model

2010 - 2014

Work Experience

Alexa Brain, Amazon

May 2018 - Aug 2018

 Applied Scientist Intern

> Explored generative regularization and implemented several weakly supervised deep learning models for name-free skill invocation on the Alexa voice interface.

> Proposed an attention-based, low-rank approximation that learns a shared embedding space for high-level application domains and low-level word tokens.

Alexa Natural Language Understanding, Amazon

May 2017 - Aug 2017

 Software Development Engineer Intern

> Developed, evaluated and visualized semantic representations for automatic ontology alignment of knowledge graphs.

Amazon Web Services, Amazon

May 2016 - Aug 2016

 Web Development Engineer Intern

> Developed a data pipeline to accelerate the execution time of CloudWatch Logs Search.

> Designed and integrated visualizations in the CloudWatch console to enable quick analysis of AWS metrics.

Indraprastha Institute of Information Technology, Delhi (IIITD)

Sep 2013 - Aug 2015

 Research Associate

> Developed from ground-up, a platform for realtime tracking, analysis and visualization of social media data. This is actively being used by several federal and state security agencies in India.

> Developed the TweetCred credibility API and the TweetCred browser extension, which were also covered by popular news outlets including The Washington Post and The New Yorker.

Google Summer of Code 2013

Jun 2013 - Sep 2013

 Software Developer Intern - ThinkUp

> Developed the data model for analyzing and generating insights from social media data, designed visualizations.

mLabs

Sep 2012 - May 2013

 Software Engineer

> Developed the complete software and hardware interface for a patented web-enabled electronic prototyping device.

Publications

Conference Papers

ADAGIO: Interactive Experimentation with Adversarial Attack and Defense for Audio

N. Das, M. Shanbhogue, S. T. Chen, L. Chen, M. E. Kounavis, D. H. Chau

European Conference on Machine Learning & Principles & Practice of Knowledge Discovery in Databases (ECML-PKDD), 2018.

SHIELD: Fast, Practical Defense and Vaccination for Deep Learning Using JPEG Compression

N. Das, M. Shanbhogue, S. T. Chen, F. Hohman, S. Li, L. Chen, M. E. Kounavis, D. H. Chau

ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), 2018.

🏆 Audience Appreciation Award (runner-up)

PASSAGE: A Travel Safety Assistant with Safe Path Recommendations for Pedestrians

M. Garvey, N. Das, J. Su, M. Natraj, B. Verma

ACM International Conference on Intelligent User Interfaces (IUI), 2016.

Workshop Posters & Papers

MLsploit: A Cloud-Based Framework for Adversarial Machine Learning Research

N. Das, E. Yang, L. Chen

Black Hat Asia, 2019.

Compression to the Rescue: Defending from Adversarial Attacks Across Modalities

N. Das, M. Shanbhogue, S. T. Chen, F. Hohman, S. Li, L. Chen, M. E. Kounavis, D. H. Chau

KDD Workshop - Project Showcase, 2018.

Defense against Adversarial Attacks using JPEG Compression

N. Das, M. Shanbhogue, S. T. Chen, F. Hohman, L. Chen, M. E. Kounavis, D. H. Chau

NIPS Workshop - Women in Machine Learning (WiML), 2017.

Training a Generative Agent Grounded in Cooperative Visual Dialog with Deep Reinforcement Learning

A. Kalia, N. Das, M. Shanbhogue, V. Parthasarathy

NIPS Workshop - Women in Machine Learning (WiML), 2017.

Preprints and Technical Reports

GOGGLES: Automatic Training Data Generation with Affinity Coding

N. Das, S. Chaba, S. Gandhi, D. H. Chau, X. Chu

arXiv preprint arXiv:1903.04552, 2019.

Keeping the Bad Guys Out: Protecting and Vaccinating Deep Learning with JPEG Compression

N. Das, M. Shanbhogue, S. T. Chen, F. Hohman, L. Chen, M. E. Kounavis, D. H. Chau

arXiv preprint arXiv:1705.02900, 2017.

Academic Reviewing

ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)

2019

Deep Learning and Security Workshop at IEEE S&P (DLS)

2018

Teaching

- Graduate Teaching Assistant (451 students)
- Head Teaching Assistant (215 students)
- Graduate Teaching Assistant (187 students)

Fall 2018
Fall 2016
Spring 2016

📖 Grants and Funding

★ Amazon AWS Research Grant

2018

Adversarial Re-Training and Model Vaccination for Robust Deep Learning

Co-PI's: H. Park, S. Freitas, D. H. Chau

Funded \$5,000 in AWS cloud credits

★ NVIDIA GPU Grant

2018

Defending Adversarial Attacks by Robust, Inference-time Local Linear Approximation

Co-PI's: S.T. Chen, S. Freitas, F. Hohman, D. H. Chau

Funded NVIDIA Titan V GPU worth \$3,000

🏆 Honors and Awards

☆ Audience Appreciation Award (runner-up) at ACM SIGKDD Conference

2018

For "SHIELD: Fast, Practical Defense and Vaccination for Deep Learning Using JPEG Compression"

☆ KDD Student Travel Award

2018

For participation at the ACM SIGKDD International Conference on Knowledge Discovery & Data Mining.

🔧 Projects

GOGGLES: Learning Interpretable Representations of Semantic Concepts [github.com/chu-data-lab/GOGGLES]

Class project for GaTech CS 8803: Data Management for Machine Learning

Fall 2018

> Proposed a novel learning framework that encapsulates high-level semantic concepts as visually grounded prototype embeddings, which serve as labelling functions for inferring class labels for image datasets.

Image Segmentation using CRFs and Conditional Image Generation using VAE

Class project for GaTech CS 8803: Probabilistic Graphical Models

Spring 2018

> Experimented with CNNs and CRFs to evaluate DeepLab, a state-of-the-art model in image segmentation.

> Given image segmentation and class labels for the segments, implemented a conditional generative model using VAE.

Neuroevolutionary Gait Simulation of Quadruped Robots [bit.ly/cse6730-gait-videos]

Class project for GaTech CSE 6730: Modeling and Simulation

Spring 2016

> Developed a simulation framework wherein quadruped robots were evolved to learn walking gaits through a neuroevolutionary mechanism using a genetic algorithm.

baudcast [github.com/nilakshdas/baudcast]

Independent open-source project

2014

> Developed a socket-based, realtime messaging library for the internet of things paradigm.

> This has been downloaded and used in over 1,000 Node.js projects.

🔧 Technical Skills

Programming: Python, Java, C++, C, Matlab, Scala, SQL

Big Data: Apache Storm, Apache Hadoop and MapReduce, Apache Spark, Pig, Apache Lucene

Machine Learning: TensorFlow, PyTorch, DyNet, Caffe, scikit-learn, Weka, Microsoft Azure ML Studio

Web Development: JavaScript ES7, Node.js, Ruby on Rails, PHP, Django, D3, jQuery