Umang Gupta

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Education

University of Southern California (USC), Los Angeles **2017 - Present**
Ph.D. in Computer Science Current GPA: 3.81/4
Advisor: Prof. Greg Ver Steeg, Information Sciences Institute USC

Indian Institute of Technology Delhi (IIT Delhi), India **2010 - 2015**
B.Tech & M.Tech (Dual Degree), Electrical Engineering (Silver Medalist) GPA: 8.9/10
Thesis: Image Classification with Ontology and Deep Learning
Advisor: Prof. Santanu Chaudhury, Dept. of Electrical Engineering, IIT Delhi

Publications

Journal & Conference Publications

Umang Gupta, Jwala Dhamala, ..., Rahul Gupta, Kai-Wei Chang, Greg Ver Steeg, Aram Galstyan
Equitable Text Generation with Distilled Language Models via Counterfactual Role Reversal
ACL 2022 (Findings)

Sahil Garg, **Umang Gupta**, Yu Chen, Syamantak Gupta, Yeshaya Adler, Anderson Schneider, Yuriy Nevmyvaka
Estimating Transfer Entropy under Long Ranged Dependencies
UAI 2022

Umang Gupta, Aaron Ferber, Bistra Dilkina, Greg Ver Steeg
Controllable Guarantees for Fair Outcomes via Contrastive Information Estimation
AAAI 2021

Umang Gupta, Dmitris Stripelis, Pradeep Lam, Paul Thompson, José Luis Ambite, Greg Ver Steeg
Membership Inference Attacks on Deep Regression Models for Neuroimaging
Medical Imaging with Deep Learning (MIDL) 2021

Umang Gupta, Pradeep Lam, Greg Ver Steeg, Paul Thompson
Improved Brain Age Estimation with Slice-based Set Networks
IEEE International Symposium on Biomedical Imaging (ISBI) 2021

Dmitris Stripelis, Hamza Saleem, Tanmay Ghai, Nikhil Dhinagar, **Umang Gupta** and Others
Secure Neuroimaging Analysis using Federated Learning with Homomorphic Encryption
International Symposium on Medical Information Processing and Analysis (SIPAIM) 2021

Nitin Kamra, **Umang Gupta**, Kai Wang, Fei Fang, Yan Liu, Milind Tambe
DeepFP for Finding Nash Equilibrium in Continuous Action Spaces
International Conference on Decision and Game Theory for Security (GameSec) 2019

Nitin Kamra, **Umang Gupta**, Fei Fang, Yan Liu, Milind Tambe
Policy Learning for Continuous Space Security Games using Neural Networks
AAAI 2018

Abhisek Datta, Anwesh Mazumdar, **Umang Gupta**, Saskia Hekker
Automated Determination of g-mode Period Spacing of Red Giant Stars
Monthly Notices of the Royal Astronomical Society 2014

Umang Gupta, Santanu Chaudhury
Deep Transfer Learning with Ontology for Image Classification
NCVPRIPG (IEEE) 2015

Umang Gupta, Niladri Chatterjee
Personality Traits Identification Using Rough Sets based Machine Learning
International Symposium on Computational and Business Intelligence (IEEE) 2013

Preprints

Dmitris Stripelis, **Umang Gupta** and Others
Secure Federated Learning for Neuroimaging
https://arxiv.org/abs/2205.05249

Dmitris Stripelis, **Umang Gupta**, Greg Ver Steeg, José Luis Ambite
Federated Progressive Sparsification (Purge, Merge, Tune)+
https://arxiv.org/abs/2204.12430

Nitin Kamra, **Umang Gupta**, Yan Liu
Deep Generative Dual Memory Network for Continual Learning
https://arxiv.org/abs/1710.10368

Workshop & Others

Ninareh Mehrabi, **Umang Gupta**, Fred Morstatter, Greg Ver Steeg, Aram Galstyan
Attributing Fair Decisions with Attention Interventions
NAACL TrustNLP Workshop

Aaron Ferber, **Umang Gupta**, Greg Ver Steeg, Bistra Dilkina
Differentiable Optimal Adversaries for Learning Fair Representations
IJCAI AI for Social Good Workshop 2020

Nitin Kamra, **Umang Gupta**, Kai Wang, Fei Fang, Yan Liu, Milind Tambe
Deep Fictitious Play for Games with Continuous Action Spaces
International Conference on Autonomous Agents and MultiAgent Systems (AAMAS) 2019

Sungyong Seo, **Umang Gupta**, Jiageng Zhu, Jeffrey Brantingham, Yan Liu
Contextual Understanding of Homicide Reports in Los Angeles County
SoCal NLP Symposium 2019

Selected Projects

Information-Theoretic Measures for Privacy & Fairness Jul'19 - Present
Controlling Fairness via Mutual Information Minimization
- Characterized an information-theoretic measure for statistical parity, a popular fairness measure
- Demonstrated an effective method for controlling fairness through contrastive mutual information estimation
- Showcased **better fairness-accuracy trade-offs** compared to recent competitive baselines

Minimizing Privacy Leakage during Training of the Neural Networks
- Illustrated realistic ways to extract private information from the models trained via federated learning
- Investigating techniques to assure data-privacy while training neural networks with applications to 3D-Neuroimaging

Continual Learning with Neural Networks Aug'17 - Jan'18
Best Theory Project Award, CSCI-599: Deep Learning, USC (2017)
- Proposed dual generative (memory) models to solve the problem of catastrophic forgetting
- Inspired from learning mechanism in humans which also has two generative memories — long term & short term
- Demonstrated better retention when learning from non-iid, sequentially arriving samples

Teaching Experience

Teaching Assistant, USC
- Special Topics in Machine Learning, CSCI699 (Spring 2022)
- Machine Learning, CSCI567 (Summer 2020, Summer 2019, Spring 2018)
- Applied Natural Language Processing, CSCI544 (Spring 2019)
- Software Engineering, CSCI310 (Fall 2017)

Teaching Assistant, IIT Delhi
- Pattern Recognition, EEL709 (Spring 2015)
- Digital Signal Processing, EEL319 (Fall 2014)
- Circuit Theory, EEL202 (Fall 2013)

Work Experience

Amazon Alexa-AI May'21 - Aug'21
Applied Scientist Intern
Proposed finetuning approaches for deriving fair language models from pretrained language models

Huawei Research, Santa Clara, CA Jun'18 - Aug'18
Research Intern
Investigated reinforcement learning algorithms for end-to-end training of `seq2seq` dialogue models

Visa Inc., Bangalore, India Aug'15 - Jul'17
Senior Software Engineer (User-Interface)
Worked on UI development using BackboneJS and ReactJS; Received excellent rating during year-end review

LCI Lab, University of British Columbia, Vancouver, Canada May'14 - Jul'14
MITACS Research Intern
Engineered tool for labeling human motion in video [Github Demo]

Amagi Media Labs, Bangalore, India May'13 - Jul'13
Software Development Intern
Automated detection of video-splicing errors using signal processing techniques; saved substantial manual efforts

Sohum Innovation Labs, Delhi, India May'12 - Dec'12
Intern
Investigated hardware for EEG signal acquisition for early detection of hearing impairments in infants

Awards and Honors

Program	Recipient of IITD Semester Merit Award for 4 of 8 semesters, 2010 - 2015
Rank 1	Highest GPA in Dual Degree Program, Department of Electrical Engineering
Hackathons	First Prize, GS Quantify 2014, annual computing competition organized by Goldman Sachs First Prize, Bing Hackathon 2016, machine learning contest organized by Microsoft Bing
Best Essay	Among top 20 National Winners, International Year of Forest, 2011 certification program
NIUS 2011	Among 30 students invited to research at HBCSE, Mumbai under National Initiative for Undergraduate Science (NIUS) program
Competitive Exams	Recipient of KVPY scholarship 2010, Dept. of Science and Technology, Govt. of India Among top 1% in Physics (NSEP); Astronomy (NSEA); Chemistry (NSEC) Olympiads 2009 Secured All India Rank 410 in IIT-Joint Entrance Exam among 0.5 million candidates

Technical Skills

Programming Languages	python, C, shell-scripts (awk/sed/bash), javascript, java
Softwares	PyTorch, JAX, TensorFlow, ReactJS, BackboneJS, NodeJS
Relevant coursework	(**USC**) Natural Language Processing, Deep Learning, Advanced Topics in Deep Learning, Learning & Game Theory, Statistical Methodology & Machine Learning, Information Extraction (**IITD**) Computer Vision, Probabilistic Graphical Models, Machine Learning, Signal Theory, Statistical Methods, Numerical Optimization, Scientific Computing, Coding Theory, Detection & Estimation Theory, System Software, Econometric Methods, Algorithms

Last updated: July 4, 2022