Shorya Consul

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Education

University of Texas at Austin, Austin, Texas **Aug 2017 - Present**
MS/PhD in Electrical and Computer Engineering

- **GPA:** 4.0/4.0
- Enrolled in bioECE track

Indian Institute of Technology Bombay, Mumbai, India **Jul 2013 - May 2017**
B.Tech in Electrical Engineering with Honours

- **Major CPI:** 9.86/10
- **Minor** in Computer Science and Engineering
- Ranked **1st** in department

Internships

ARM Research, Austin, Texas **Summer 2020**
Data & AI Services Team

- Abstracted the problem of targeting advertising based on ad clicks
- Developed an variational autoencoder and reinforcement learning-based approach to improve funneling

CognitiveScale, Austin, Texas **Summer 2019**
Machine Learning Team

- Developed an AI risk assessment tool for regression
- Tool scores black-box models on metrics such as explainability and fairness
- Placed **first** among interns for internal Shark Tank competition on products for responsible AI

Research Experience

Differentially Private Median Forests
Prof. Sinead Williamson, Statistics, UT Austin *July 2019 - June 2020*

- Devised a novel learning scheme for decision forests that guarantees differential privacy or
- Proposed method can consume mixed features, and can be used for regression and classification
- Derived utility bounds for proposed scheme as a function of hyperparameters of decision forest

Reconstructing Intra-tumor Heterogenity via Convex Optimization and Branch-and-Bound Search
Prof. Haris Vikalo, ECE, UT Austin *May 2018 - present*

- Formulated problem as the minimization of a squared error cost function
- Tumor fractions and copy numbers in each tumor strain identified via alternating minimization
- Developing a pipeline that can improve performance by using SNP information

Nonparametric Bayesian Genotype Imputation with Error Correction
Prof. Haris Vikalo, ECE, UT Austin *Jan 2018 - present*

- Utilized a categorical IBP prior to model genotype panels with a ternary alphabet
- Adopted a confusion matrix as error model for reads with a random mask to simulate missing entries
- Devised a MCMC sampler to derive estimates of error rates and true genotype panel

Analysis and Development of Techniques for Foetal Heart Rate Estimation from US Doppler Signals
Prof. Preeti Rao, EE, IITB *July 2016 - May 2017*

- Studied and modified existing methods for foetal heart rate (FHR) measurement from US Doppler signals
- Compared them to FHR measurements from commercially available machines
- Targeted the development of a low-cost alternative to existing apparatus

Publications

- S.Consul,S. Williamson, **Differentially Private Median Forests for Regression and Classification**, *Preprint*

- S. Consul,H. Vikalo, **Reconstructing Intra-Tumor Heterogeneity via Convex Optimization and Branch-and-Bound Search**. *ACM-BCB 2019*
- S. Consul,A. Hashemi,H. Vikalo, **A MAP Framework for Support Recovery of Sparse Signals Using Orthogonal Least Squares**. *ICASSP 2019*

Academic Projects

Uncovering User Data in Federated Learning *EE 381V: Fair/Transparent Machine Learning*
Guide: Prof. Joydeep Ghosh, ECE, UT Austin *Spring 2019*

- Used influence functions to glean information about training data in a federated setting
- Method seems effective with simple datasets but does not give clear results with more complex datasets

MAP Framework for Support Detection Using OLS *EE 381K: Estimation Theory*
Guide: Prof. Haris Vikalo, ECE, UT Austin *Fall 2017*

- Devised a framework to extend the Orthogonal Least Squares (OLS) method to guarantee optimality of derived support set in the MAP sense
- Compared devised method to OLS and other existing algorithms for support detection

Automatic Playlist Continuation *EE 380L: Data Mining*
Guide: Prof. Joydeep Ghosh, ECE, UT Austin *Spring 2018*

- Implemented variations of collaborative filtering and matrix factorization to rank songs
- Utilized subset of dataset released for from Spotify Challenge 2018
- Explored the use of item-item embeddings and metadata to improve performance

Achievements and Awards

- Recipient of **four-year fellowship** from University of Texas at Austin Graduate School
- Awarded **Institute Silver Medal** for being ranked 1^{st} in the graduating EE batch at IIT Bombay
- Received **Prof. K.C. Mukherjee Award** for the best final year project at IIT Bombay
- Recipient of **Institute Academic Prize** for the academic years 2013-14 and 2015-16
- Awarded **AP grade** in *Computer Programming*, *Digital Systems*, *Signals and Systems* and *Control Systems*
- **Urvish Medh Memorial Prize** in 2016 for standing 1^{st} in the department

Skills

- Proficient in Python, MATLAB, C++, LaTeX, Bash, PyTorch and Tensorflow
- Comfortable with both Windows and Unix (Ubuntu)
- Great team skills and problem-solving ability
- Fluent in English and Hindi

Key Courses Taken

Statistical Machine Learning, *Deep Learning Seminar*, *Large Scale Optimization*, *Genomic Signal Processing*, *Fair & Transparent Machine Learning*, *Monte Carlo Methods*, *Reinforcement Learning*, *Data Mining*, , *Estimation Theory*

Other Experience

President *GREECE (Graduate ECE)*
UT Austin *Spring 2020*

- Hosted companies for technical talks and organized graduate student socials
- Managed transition to new executive board at end of tenure

Vice-President *GREECE (Graduate ECE)*
UT Austin *Fall 2019*

- Founding member of graduate student organization within ECE department
- Aim to foster a sense of community among ECE students and serve as a forum for networking with industry

Teaching Assistant *UT Austin*
Digital Signal Processing, *Introduction to Automatic Control* *Fall 2017*, *Fall 2018*, *Spring 2019*

- Holding regular office hours to clarify doubts and homework

- Designing and grading homeworks and examinations

Teaching Assistant *IIT Bombay*
Partial Differential Equations *Autumn 2015, 2016*

- Taught and resolved doubts for a class of approximately 60 students
- Assisted in formulating the examinations for the course, and aided in the logistics and grading