# Nilay Thakor

http://www.nthakor.github.io

Email : nthakor4@jhu.edu
Mobile : +1-281-818-6260


## Education

- **MSE in Applied Maths & Statistics** | Johns Hopkins University
  Baltimore, MD | May 2020
- **B. Tech in Mechanical Eng. with minor in Computer Science** | IIT Gandhinagar
  Gandhinagar, India | Apr 2017

## Experience

- **Research Fellow in Deep Learning** | IIT Gandhinagar
  Gandhinagar, India | Oct 2017 - Dec 2018
  - **Theoritical analysis**:
    - Analysis of explicit and implicit density estimation using Deep Learning
    - Review of ELBo bound and comparison with Adversarial Density Estimation
    - Adversarial Attacks and Defenses on Deep Neural Networks
    - Domain Adaptation
  - **Projects**:
    - Cross Domain Natural Language Generation[1]
    - Extraction of Gravitational Waves using GAN[1]
    - Statistical measures to understand the mode collapse and sample quality in generative models
- **Software Engineer R&D, ML Consultant** | Arista Networks[2]
  Pune, India | May 2017 - Nov 2018
  - Designed experiments for hypothesis testing and data collection techniques to extract various QoS metrics for web Apps
  - Developed machine learning models to estimate quality of VoIP, video streaming and interactive web applications using network level parameters (Patent Pending)
  - Created data pipelines and trained production ready ML models for reporting the app performance instantaneously
  - Built RCA tools in product using machine learning

## Internships

- **Research Intern in Deep Learning** | University of Notre Dame
  Notre Dame, IN | Summer 2016
  - Worked on resolving impact of class imbalance on healthcare data analysis using Deep Learning
  - Using stacked denoising autoencoders developed oversampling mechanism for underrepresented class that resulted in significant boost in performance
- **Data Science Intern** | Cretif Safety Solutions
  Gandhinagar, India | Dec 2015 - April 2016
  - Devised driving pattern recognition algorithm using accelerometer and gyroscope data from the smartphone
  - Programmed a robust, safe driving ranking algorithm that captures a wide range of aspects such as traffic, road conditions, road surface, etc

## Research Project

- **Gravitational Waves optimal template placement** | IIT Gandhinagar
  Prof. Anand Sengupta | Jul 2015 - May 2016
  - Invented efficient sampling method of gravitational waves source parameters to minimize cost of match filtering (This method reduces optimal sample size by $\sim$35% and provides speedup of $\sim$50 times)
  - **Publication:** Roy, Soumen, Anand S. Sengupta, and Nilay Thakor. "Hybrid geometric-random template-placement algorithm for gravitational wave searches from compact binary coalescences." *Physical Review D* 95.10 (2017): 104045.

[1] publication in works
[2] formerly Mojo Networks

## Course Projects

- **Combinatorial Optimization using Deep Learning** | Deep Learning for Discrete Optimization
  Johns Hopkins University | Spring 2019
  - Created supervised seq2seq model to solve Travelling Salesman Problem
  - Improved existing architecture by adding transformer and convolution plus self-attention models
  - Combined modified sequence model with reinforcement learning approaches
- **Non-parametric Deep Generative Models** | Advanced Topics in Bayesian Statistics
  Johns Hopkins University | Spring 2019
  - Worked on variational auto-encoders with stick-breaking prior to extend the complexity of approximation and improve sample quality
- **Node sampling analysis using node representation** | Algorithms for Data Science
  IIT Gandhinagar | Spring 2017
  - Implemented node representation learning for large graph using deep learning
  - Using various graph sampling method, learned embeddings for sampled graph and used them to reconstruction remaining edges
  - Determined "quality" of sampling techniques through link prediction as proxy task
- **Feature Marching in Computer Vision using GPU** | Algorithms for Data Science
  IIT Gandhinagar | Spring 2017
  - Parallelized feature matching in images (using KDTrees) on GPU using CUDA

## Awards

- Mojo Employee Spirit Award for Best R&D — Mojo Networks
- Dean's List for excellent academic performance — IIT Gandhinagar

## Teaching Experience

- Applied Maths for Engineers — JHU
- Machine Learning and Pattern Recognition — IIT Gandhinagar
- Deep Generative Models — IIT Gandhinagar

## Skills

- **Languages**:Python, R, C, SQL
- **Libraries**: TensorFlow,PyTorch,sklearn,TF-Probability,Pandas

## Courses

**Undergraduate**
- Algorithms and Data Structures
- Machine Learning
- Algorithms for Data Science
- Data Management
- Algorithms for Advanced Computer Architectures

**Graduate**
- Deep Learning in Discrete Optimization
- Advanced Topics in Bayesian Statistics
- Time Series Analysis