Rini Jasmine Gladstone

Doctoral Student

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A highly motivated doctoral student and data scientist, with research interests in the intersection of design optimization and physics based deep learning, uncertainty quantification and machine learning.

Research Interests

- Physics based Deep Learning, Design optimization, Uncertainty Quantification, Machine learning

Education

2019-08 - Current

PhD.: Civil Engineering

University of Illinois At Urbana-Champaign - Champaign, IL

- Area : Sustainable and Resilient Infrastructure Systems
- Concentration : Computational Science and Engineering
- GPA : 3.87/4
- Coursework : Numerical Analysis, Applied Machine Learning, Deep Learning, Uncertainty Quantification, Structural Design Optimization, Numerical Methods for PDE, Statistical Learning

2008-08 - 2013-07

Dual Degree, Bachelor And Master of Technology: Civil Engineering

Indian Institute of Technology Madras - India

- Area : Infrastructural Engineering
- Minor : Industrial Engineering
- GPA : 8.81/10 (Top 1% of class)
- Thesis: Traffic Detection and Classification under DSNR Scenario under Indian Conditions

Research Projects

- Robust Topology Optimization using Variational Autoencoders (PhD Advisor: Dr. Hadi Meidani)

Applied deep learning techniques to solve a topology optimization problem with input uncertainty. Used novel methods such as variational autoencoder for parametrization of design and reduction of dimensionality and deep

neural network and gradient descent for design optimization, making it computationally more efficient than finite element solvers. Paper under review in Computers and Structures.

- Efficient Training of Physics-Informed Neural Networks (PINNs) via Importance Sampling (PhD Advisor: Dr. Hadi Meidani)

Studied the application of importance sampling for improving the training of PINNs which are used to solve physics related problems with governing equations in the form of PDEs. The numerical examples for this application that were implemented include linear elasticity and transient problems. Paper published in Computer-Aided Civil and Infrastructure Engineering.

- Traffic Detection and Classification under DSNR Scenario under Indian Conditions (Thesis Advisor: Dr. Gitakrishnan Ramadurai)

Developed a Video Image Processing model for the detection & classification of vehicles for Indian conditions under normal as well as extreme (DSNR) scenarios (Dense traffic, Shadows, Night time and Rainy condition). Achieved a reliability of 87% in vehicle detection under different environmental conditions and traffic scenarios (better than the commercially available models for the same). Received sponsorship from the Ministry of Urban Development, Govt. of India as a part of Centre for Excellence in Urban Transportation

Work History

2022-05 - Current

Research Scientist Intern

Meta Reality Labs, Redmond, WA

Graph Neural Networks for time independent solid mechanics problems. Manuscript in progress.

2015-05 - 2019-07

Data Scientist

Tiger Analytics, Chennai, India

- Price Recommendation Engine for a leading Consumer Packaged Goods (CPG) company

Built a regularized regression for modeling the price elasticities of different items at a store level. Developed a prize optimization framework to use the modeled price elasticity to give the optimum price for every item at a store level maximizing the revenue of the store.

- Real time fraud detection engine and online CTR prediction for a leading digital media company

Built real-time fraud detection engine to flag fake advertisement requests from dummy users and bots. Developed a real time online predictive algorithm for Click Through Rates (CTR) using stochastic gradient descent for CTR prediction.

- Customer analytics solution for a large brick and mortar retailer

Built an analytics solution to uncover customer purchase patterns, predict repeat purchase rate of customers and purchase value of repeat purchases. Carried out affinity analysis to identify the departments of stores significant to repeat purchase rate model and purchase value model.

- Recommendations for increasing category share of moped sales for a leading automobile company

Built a mixed effects model to attribute the factors impacting the category share of moped sales. Identified the key enablers/ disablers in customer demographics, retail finance, campaigns and promotions, price and competition and quantified them to provide actionable insights.

Technical Skills

- Statistical Tools : R, Python, SAS, MATLAB, SQL, Microsoft Excel
- Packages/ Libraries : TensorFlow, PyTorch, OpenCV, Sci-kit learn
- Programming Languages : C, C++, Excel VBA
- Visualization Tools : Tableau

Awards

- Kuck Fellowship for Computational Science and Engineering, 2021
- NSF fellowship to present paper at MMLDT-CSET Conference at San Diego from Sep 26-29, 2021.
- Ravindar K. and Kavita Kinra Fellowship in the Department of Civil and Environmental Engineering in the area of transportation engineering for the academic year 2019-20
- Research Assistantship Award for the academic year 2020-21, 2021-22, 2022-23
- Teaching Assistant Award for the academic year 2012-13 at IIT Madras for the courses Introduction to Civil Engineering and Transportation Engineering

Extra Curricular Initiatives and Accomplishments

- Developed a Google Assistant application, Home Classroom, as part of "Google Actions I/O Challenge 2017", a competition by Google to create voice based Google Assistant. The application enables students to take practice tests in different subjects that the teachers have created, using voice recognition.
- Finalist of IIT Madras Symposium 2010, Chennai, Tamil Nadu, India. Worked on modularization of curriculum to incorporate flexibility & localization-included in pilot program to be implemented in a village.
- Team Leader of the project conducted on the topic “Water-borne diseases-Nightmare of Killiyar” in 2007, presented in the 12th National Children's Science Congress (one of 135 out of around 2500 projects selected from all over India). Organized a free medical camp for 150 inhabitants in collaboration with Government Hospital, Karamana, Kerala, India