

TECHNICAL EXPERIENCE/PROJECTS

Graduate Research Assistant

September 2020 — Present

Spacecraft Robotics and Control Laboratory, Carleton University

Ottawa, Canada

- Developing a novel path planning algorithm for spacecraft rendezvous and proximity operations under uncertainties, using Machine Learning/Artificial Intelligence techniques.

Graduate Research Assistant - Machine Learning

May 2022 — September 2022

Mitacs Business Strategy Internship - AI Quest Inc and George Brown College

Toronto, Canada

- Performed data analysis on large scale drug datasets (40GB) to discover and analyze relationships between drug compound structure and Adverse drug reactions

Image Classification for Cifar10 Dataset

October 2022

Applied Artificial Intelligence, Carleton University

Ottawa, Canada

- Deep learning project regarding the classification problem of the CIFAR-10 dataset using Convolutional Neural Networks. Best accuracy is provided by Optimizer - SGD for the best model with 83 % accuracy.

Flight Ticket Fare Prediction

July 2020

Personal Project

- A complete end-to-end project to predict the domestic flight prices in India depending on various features using **Random Forest Regressor** and **XGBoost Regressor** which is then deployed as a Flask Web Application on Render.

HR Analysis on Graduate Turnover

May 2019

Big Data Analytics in Engineering, Wichita State University

Wichita, USA

- Project based on the graduate employee turnover dataset which consists of HR information collected at the time of the recruitment process which contains scores and ratings. Predicted graduate turnover based on their personal traits and other assessment scores using Logistic regression and Decision trees in R programming language.

PUBLICATIONS

Reinforcement Learning for Sequential Low-Thrust Orbit Raising Problem, Arora L., Dutta A.

January 2020

30th AAS/AIAA Space Flight Mechanics Meeting in conjunction with the AIAA Science and Technology Forum and Exposition (SciTech 2020)

- Developed a reinforcement learning algorithm, Deep Q-learning to be more specific, using MATLAB for optimal tuning of the weights of the objective function for the electric orbit-raising problem of the spacecraft. Best MSE: 0.0025.

Objective Function Weight Selection for Sequential Low-Thrust Orbit-Raising Optimization Problem, Dutta A., Arora L. January 2019

29th AAS/AIAA Space Flight Mechanics Meeting, Ka'anapali, Maui

- Explored the impact of weights the objective function components on the optimality gap of computed orbit-raising trajectories, and numerical examples based on a variety of orbit-raising scenarios are used to illustrate this effect.

SKILLS

Programming languages

MATLAB, Python, Julia, R, C++

Quantitative Research

Mathematical optimization, Mathematical Modeling, MySQL

Frequently used

NumPy, Pandas, Scikit-learn, Keras, TensorFlow, matplotlib, PySpark, PyTorch, IBM Watson Studio, Jupyter Notebook, NLP, Generative AI, SQL, Tableau, SPSS, Microsoft Office- Word, PowerPoint, Excel, Neuralworks Pro II, \LaTeX

Communication

English, Hindi (fluent speaker), German(A2 Level)

EDUCATION

Doctor of Philosophy, Aerospace Engineering, Carleton University, Canada

Pursuing

Master of Science (Thesis-based), Aerospace Engineering, Wichita State University, USA

May 2020

Bachelor of Technology, Aeronautical Engineering Manipal Institute of Technology, India

May 2017

CERTIFICATIONS

Google Cloud - Introduction to Generative AI

November 2023

- Microlearning course aimed at explaining what Generative AI is, how it is used, and how it differs from traditional machine learning methods. Covered Google Tools to help you develop your own Gen AI apps, as well.

Business Analytics Course by IMS Proschool

December 2020

- Acquired a deep understanding of the fundamental concepts and tools of Business Analytics to communicate data insights to stakeholders using visualizations, dashboards, and reports.

IBM Data Science Professional Certificate

December 2019

- Included 9 courses with latest job-ready skills and techniques covering a wide array of data science topics including: open source tools and libraries, methodologies, Python, databases, SQL, data visualization, data analysis, and machine learning.