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Lakshay Arora

Ph.D. Candidate

Portfolio: lakshay-arora.com
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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

Student Cost-of-Living Calculator In Canada **May 2024**
Personal Project
- Designed a Streamlit-powered cost-of-living calculator utilizing Generative AI to assist Canadian students in making informed decisions about living and studying based on their budget and lifestyle preferences.

Deep Reinforcement Learning for Robust Spacecraft Rendezvous Guidance **October 2022**
Applied Artificial Intelligence, Carleton University *Ottawa, Canada*
- Implemented Deep deterministic policy gradient (DDPG) algorithm for guiding spacecraft proximity operations autonomously.

Flight Ticket Fare Prediction **July 2020**
Personal Project
- Developed an end-to-end project to predict domestic flight prices in India using Random Forest and XGBoost regressors, deployed as a Flask web application on Render.

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, Google Cloud Platform (GCP), 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**
- Completed a microlearning certification on Generative AI, covering its fundamentals, applications, and distinctions from traditional machine learning. The course included practical training on using Google tools to develop Generative AI applications.

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.