

Arjun Vaithilingam Sudhakar

Linkedin: <https://www.linkedin.com/in/innovatorarjun>

Github: <https://github.com/innovator-arjun>

Email: innovatorarjun@gmail.com

EDUCATION

- Polytechnique Montréal, Mila - Quebec AI Institute** Montreal, Quebec, Canada
Doctor of Philosophy - Computer Science - Machine Learning Specialization
Supervisor: Prof.Sarath Chandar
Research Interest: • Interactive Learning • Language Models • Reinforcement Learning
August 2022 - 2026*
- University of Montreal, Mila - Quebec AI Institute** Montreal, Quebec, Canada
Master of Science - Computer Science - Machine Learning Specialization
Mentors: Prof.Sarath Chandar, Dr.Prasanna Parthasarathi
Courses: Representation Learning, Reinforcement Learning, Machine learning, Advanced Projects in Machine Learning, Data Science, Neural Scaling Law
August 2020 - 2022
- Anna University, RMD Engineering College** India
Bachelor of Technology - Information Technology
Courses: Artificial Intelligence, Database Management System, Data Structures, Analysis Of Algorithms, Software Engineering
August 2013 - 2017

SKILLS SUMMARY

- Technical Skills:** Python, Pytorch, Tensorflow, SQL, Numpy, Pandas, Wandb, Seaborn, LaTeX, Linux
- Soft Skills:** Leadership, Event Management, Public Speaking, Time Management

EXPERIENCE

- Mila - Quebec AI Institute, Chandar Lab**
Research Assistant (Full Time) August 2021 - August 2022
 - Language Model as Task Solver** - Develop language models (GPT-2) based on human gameplay, linguistic priors, and improved action candidates based on game history
 - Feature Diversity in Self Supervised Algorithm** - Understanding factors promoting feature diversity in CNN components on Self Supervised Algorithms. We found that diversity is proportional to the width of the model
 - Interactive learning in text based games using reinforcement learning** - Using Reinforcement Learning to learn optimal Q-values using DQN where action space is defined by sentences in natural language
- Hydro Quebec, Montreal, Quebec**
AI Research Intern (Full Time(May - Aug), Part Time(Sep - Jan)) May 2021 - January 2022
 - Did a review of the literature, a proof of concept, and a feasibility study on 3D Object Detection and Video Object Detection for Autonomous Vehicles.
 - For Dial Inspection, we implemented an OpenCV approach end-to-end and a CNN Model. Outputs are cross-verified for reliability between them.
 - Effectively using synthetic data gen, preprocessing, data augmentation, dropouts, model opt., and careful hyperparameter tuning, we got around 95 % accuracy on the test set.
- Wipro Technologies, India**
Machine Learning Engineer(Full Time) October 2017 - July 2020
 - With Metrics beats installed in the server, data from each server's CPU, memory, disk, and network is collected for time ahead prediction to prevent server failure
 - Data from the server is collected in second intervals. We rolled up to minutes with 45 days of data to predict 1 day ahead. i.e., $1440 \times 45 = 64800$ records for a single server
 - We experimented with different values of hyper parameters such as epochs, neurons, batch size, number of LSTM layers, and drop out percentage to find the best-suited values for our business problem and performed anomaly prediction based on the SME's threshold. We got an average of 81 % accuracy on the test set.

PROJECTS

- Voice Activity Detection-Speech Brain.** [link] Packages: Pytorch, SpeechBrain toolkit
 - Worked on building a speech activity detection system to process input waveforms to identify speech segments from background noises
 - Created a preprocessing script that deals with long recordings by dividing them into multiple overlapping chunks and combining their results.
 - After careful tuning of hyper-parameters, the model we got a test F-Score of 0.94, matching the state of the art.
- Built 10 Machine/Deep Learning Algorithms from Scratch** [link] Packages: Numpy, Pandas, Seaborn
 - Implemented machine learning algorithms intuition with gradient descents from scratch using NumPy and Pandas.
 - Algorithms include Linear Regression variants, Logistic Regression, Naïve Bayes, KNN, PCA, SVC and Neural Network.

PUBLICATIONS

- Pranshu Malviya*, **Arjun Vaithilingam Sudhakar***, *Feature Diversity in Self Supervised Learning*, Conference on Lifelong Learning Agents-Workshop 2022 [link]

ACADEMIC SERVICES

- **Lab Manager, Chandar Research Lab, Mila - Quebec AI Institute** August 2021 - Present
Responsibilities: Management, students onboarding, proposal writing
 - I managed the whole proposal process and assisted in writing (Google teaching proposal, CIFAR) so that everything went smoothly. Both the proposals were approved for the lab.
 - Created a Web Development Team through outsourcing, which saves research time for students and increases publicity for the lab through quality sites with less cost incurring.
- **Toastmasters International (Nonprofit Educational Organization)** April 2018 - Present
Responsibilities: Peer-to-Peer Learning, Public Speaking, Leadership
 - **Associate Area Director:** Led 150+ members across corporate and college clubs of District 92, Toastmasters International. The Area Director role is similar to that of leading five different business units across different geos/markets at the same time. In addition, I persuaded CXO to implement a \$25,000 USD per year membership reimbursement programme (pilot) across Wipro.
 - **Associate President** Increased the club strength from 4 people to 40 people in the span of less than 1 year. In addition to that, we conducted the 250th Meeting Milestone events with a 100+ audience and Club Contests for Public Speaking.
- **Teaching Assistant, AI4Good (Nonprofit Organization)** June 2022 - July 2022
Responsibilities: Mentoring, Teaching, Creating Learning Material, Office Hours
 - Through this program, we guided and mentored underserved female students to begin or advance their careers in machine learning/Deep Learning.
 - Taught supplementary materials concepts such as Math, ML, DL, and RL. Also, mentored a case-study project on 'Emotive Application to capture the mental health using Machine and Deep Learning for 4 weeks.
- **Teaching Assistant, INF8245E - Machine Learning** Sept 2021 - December 2021
Responsibilities: Assignment Preparation, Teaching, Creating Material, Office Hours
 - Proposed Idea to have Math and python tutorial for students to brush-up pre-requisites. Linear Algebra and Scikit tutorials were created from scratch and delivered to class students.
 - The website and YouTube lectures were kept up to date. I also kept a close track on how to improve the course next year based on students' feedback.

SCHOLORSHIP

- Mila-Quebec AI Institute Graduate Funding (2022-2026) [Value: \$ 27,000 CAD per year]
- Ecole Polytechnique-Exemption Scholarship (2022-2026) [Value: \$ 17,000 CAD per year]
- Microsoft Diversity Award (2021) [Value: \$4,000 CAD]
- University of Montreal-Exemption Scholarship (2020-2022)[Value: \$9,500 CAD per year]

TECHNICAL TALKS

- *Neural Networks*-Rajalakshi Engineering College, India-2020
- *Machine Learning Projects*-Bishop Heber College-2020
- *Machine Learning*-RMD Engineering College-2020
- *Linear Algebra*-Bishop Heber College, India-2019

HONORS AND AWARDS

- Received the *Best Student Award*-2016 by the Indian Society of Technical Education (ISTE)
- Received Cognizant-*Best Project Award* 2017
- *Innovation Award*-2016 by Innovation and Entrepreneurship Development Cell (IEDC)-Government Of India
- Chief Judge in Design Thinking Contest-Rajalakshmi Engineering College (2019)