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Rahul Kumar Dass

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Education

University of Miami Coral Gables, FL
Doctor of Philosophy in Computer Science; GPA: 3.85/4.00 **May 2022 (Expected)**
Selected coursework: Machine Learning; Pattern Recognition and Neural Networks; Design and Analysis of Algorithms

Indiana State University Terre Haute, IN
Master of Science in Computer Science, GPA: 3.89/4.00 May 2017
Thesis: Decision Tree Learning – implementation and improvement of ID3 algorithm
Advisor: Dr. Lászzló Egri.

Lancaster University Lancaster, United Kingdom
Master of Physics in Theoretical Physics, GPA: 3.0/4.0 (Second Class Honours) July 2013
Thesis: Quantum Field Theory II
Advisor: Dr. Anupam Mazumdar.

*Bachelor Degree equivalency**
*[Completed three-years of full-time undergraduate coursework and proceeded straight to a Master's degree.]

Programming Languages and Technologies

Python; C/C++; Linux tools; Vim; Bash; SQL; Git/Github; Java; LaTeX– proficient.
TensorFlow; JavaScript; MongoDB; Redis; PostgreSQL; – prior experience.
OpenCV, Numpy, Pandas, Matplotlib, scikit-learn – Data Science tools used

Relevant Experience

University of Miami Coral Gables, FL
Graduate Research Assistant - *Department of Computer Science* January 2018 – Present

- Installing and configuring a cluster (1-head node and 32-compute nodes) from scratch; developing StarExec-Miami, an NSF funded open-source fork distribution of StarExec, a logic solving software that uses enterprise level architecture for distributed HPC. [https://github.com/rkdass/StarExec]
- Debugging (approx. 138K lines) of Java backend and HTML/JS frontend using Linux tools, MySQL and SGE scheduler log files as part of a 3-member team at UM in collaboration with remote developers/researchers at the University of Iowa.

Graduate Teaching Assistant - *Department of Computer Science* August 2017 – Present

- CSC 424 – Network communication and security (Grader* and held 4-hr weekly C lab sessions > 20 undergrad CS majors)
- CSC 220 – Computer Science Programming II (4-hr weekly Java lab sessions > 30 undergrad CS majors)
- CSC 401 – Computer Science Practicum 1 (Grading projects involving core algorithm implementations in JavaScript)
- CSC 545 – Intro. to Artificial Intelligence (Grader* and seven hour/week lab sessions to help undergrads)

***[created bash scripts and Makefiles to help automate student grading]*

Summer Research Assistant - *Department of Sociology* May 2018 – July 2018

- Responsible for writing the computational challenges for an interdisciplinary grant application to fund a project aimed at linking criminal sentencing disparities with skin tone in the Miami-Dade County, by using Machine Learning (ML) and leveraging domain expert knowledge in partnership with UM sociology and law researchers.
- Created Python scripts and used Linux tools to perform data engineering: matching jail number IDs with 200K unlabeled images, forming 15-batches of 2K images each, distributed to undergrad raters to assign labels as part of the ML pipeline.

Independent Research Projects

- **Facial profiling using deep learning** (Dec 2018 – present): awarded the U-Link Grant to develop a semi-supervised ML model using 200K mugshot images of 4-ethnic groups: black, white, Hispanic, non-Hispanic from Miami-Dade County, for facial landmark detection (Afrocentric features) and skin tone measures using Deep Learning and OpenCV.
- **Q-learning in OpenAI Gym** (Jan – May 2018): developed and implemented the Q-learning algorithm using Python where an agent navigated to its goal within the FrozenLake and CartPole environments. Initially using a look-up Q-table approach for finite state-action pairs to then generalizing to a 3-layer neural network using a function approximator.
- **SARSA Pathfinding** (Apr 2018): developed and implemented the SARSA algorithm in Python. Using an ϵ-greedy policy, an agent learned the shortest path from start to goal in mazes of varying sizes and obstacles, based on episodic formulation.
- **Deep Learning for MNIST** (Nov – Dec 2017): implemented various machine learning algorithms (MLPM, RNN, CNN, CNN with TFLearn) using Python on the MNIST dataset to gain deeper understanding of how Deep Learning works.

Employment

Indiana State University Terre Haute, IN
Graduate Assistant - Graduate Council (GC) January 2016 – May 2017

- Brought awareness to university policy makers of the fact that a large majority of international students on-campus were uninsured and caused a revision in student healthcare policy, by creating and leading an ad-hoc committee to explore healthcare options by visiting local hospitals, clinics and enquiring about options on the Federal Marketplace

Awards and Achievements

- University of Miami: U-Link Phase 1 Grant (Jan – Aug 2019)
- Indiana State University: Graduate Summer Scholarship (May – July 2016).
- Lancaster University: Bowland Summer Vacation Grant (2011), Willcock Scholarship (2010 and 2013).

Technical Documents**

**[For a complete list, please visit: https://miami.academia.edu/RahulDass Note: this is not a list of publications but a list of technical documentations written when conducting independent research/projects.]

[1] Dass R., *Q-Learning: Tabular to Neural Networks.* ECE 753 – Final Report, University of Miami, 2018.

[2] Dass R., Ma L., and Manolovitz B., *Reinforcement Learning: Navigating mazes using SARSA.* ECE 648 – Project 3, University of Miami, 2018.

[3] Ma L., Manolovitz B., and Dass R., *Radial Basis-function Network.* ECE 648 – Project 2, University of Miami, 2018.

[4] Ma L., Manolovitz B., and Dass R., *Linear Classification: Perceptron vs WINNOW.* ECE 648 – Project 1, University of Miami, 2018.

[5] Dass R., *Decision Tree Learning – An implementation and improvement of the ID3 algorithm.* CS 695 – Final Report, Indiana State University, 2017.

[6] Dass R., Mukherjee A. and Banerjee S. *Student Java Online Documentation.* PGDSE – Advanced Java Project, Jadavpur University, 2013.

[7] Dass R., *Library Automated System.* PGDSE – Visual Basic.Net Project, Jadavpur University, 2013.

[8] Dass R., *Quantum Field Theory II.* PHYS 451 – Master of Physics Thesis, Lancaster University, 2013.

[9] Dass R., *The quantum theory of many interacting particles with an investigation into the jelly model of a degenerate electron gas.* PHYS 373 – Mini-project III, Lancaster University, 2012.

[10] Dass R., *Symmetry in quantum mechanics through group theory and its representations.* PHYS 372 – Mini-project II, Lancaster University, 2012.

[11] Dass R., *The variational method and applying the perturbation theory to derive the Fermi-Dirac Distribution.* PHYS 371 – Mini-project I, Lancaster University, 2011.