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# Rahul Kumar Dass

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## Education

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### University of Miami

*Ph.D. – Computer Science, GPA: 3.85/4.0*

Coral Gables, FL

May 2022 (Expected)

**Selected coursework:** Blockchain; GPU-programming; Algorithms; Quantum Computing; Machine Learning

### Indiana State University

*Master of Science – Computer Science, GPA: 3.89/4.00*

Terre Haute, IN

May 2017

**Research:** Decision Tree Learning (ID3/C4.5 algorithm)

**Advisor:** Dr. László Egri.

### Lancaster University

*Master of Physics – Theoretical Physics Honours*

Lancaster, United Kingdom

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

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Python; C/C++; Linux tools; Vim; Bash; SQL; Java; LaTeX– proficient.

TensorFlow; JavaScript; MongoDB; Redis; PostgreSQL; – prior experience.

## Relevant Experience

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### 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 student raters to provide labels that will be used in the ML pipeline.

## 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  $\epsilon$ -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.

## Groups and Other Experience

- ACM – ICPC North America Qualification Programming Contest 2015, 2016

## 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 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 WINNOWER*. 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.