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# Rahul Kumar Dass

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## Education

### University of Miami

*Doctor of Philosophy in Computer Science; GPA: 3.85/4.00*

Coral Gables, FL

**May 2022 (Expected)**

### Indiana State University

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

Terre Haute, IN

May 2017

**Thesis:** Decision Tree Learning – implementation and improvement of ID3 algorithm

**Advisor:** Dr. László Egri.

### Lancaster University

*Master of Physics in Theoretical Physics, GPA: 3.0/4.0 (Second Class 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.]*

## Experience

### University of Miami

Coral Gables, FL

#### Graduate Research Assistant - Department of Computer Science

January 2018 – August 2019

- Installing and configuring a cluster (1-head node and 32-compute nodes) from scratch to create an NSF-funded **open source**, distributed HPC infrastructure for experimental evaluation of an automated theorem proving system called StarExec-Miami, fork of StarExec which uses enterprise level architecture. (NSF Award Number 1730419)
- Improved codebase for jobs to fully utilize hardware resources by using native StarExec, **SGE** and **Linux log files** to debug, troubleshoot and resolve software compatibility issues. Code edits were proposed as **git** pull requests and were merged with the original StarExec repository.

#### Graduate Teaching Assistant - Department of Computer Science

August 2017 – May 2019

- CSC 424 – Network communication and security (Grader\*\* and held 4-hr/week **C** lab sessions > 20 undergrad CS seniors)
- CSC 220 – Computer Science Programming II (4-hr weekly **Java** lab sessions > 30 undergrad CS majors)
- CSC 401 – Computer Science Practicum I (Grader\*\* and held weekly **JS/HTML** office hours for 8 undergrad CS seniors)
- CSC 545 – Intro. to Artificial Intelligence (Grader\*\* and 7-hr/week **Java** lab sessions to help CS seniors)

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

#### Summer Research Assistant - Department of Sociology

May 2018 – July 2018

- Improved manual data preprocessing using automation by linking 200,000 unlabeled mugshots' jail number IDs with their court records and created a training dataset of 14,000 mugshots for 3 student raters resulting to 42,000 individual labels as part of a machine learning pipeline. Used **Python scripts** and **Linux tools**.

## Research Projects

- Predictive Policing** (Aug 2019 – present): testing if current deep learning models reinforce racial inequalities based on transfer learning approaches using **Python**, **Keras/TensorFlow** and **TorchVision/PyTorch**. Also, exploring if adding facial landmark measures and image preprocessing (face segmentation, cropping, pose correction etc.) using **OpenCV/Dlib** improves arrestee's race/ethnicity classification to help prevent bias within the criminal justice system.
- Facial profiling using deep learning** (Dec 2018 – July 2019): assessed mugshots' classification accuracies based on 1) two race groups (Black and White), and 2) four race/ethnicity subgroups (Black Hispanic, Black non-Hispanic, White Hispanic, White non-Hispanic) by fine-tuning VGG-16 and VGG-Face models using two Nvidia Tesla P100s, obtaining 85% and 93.7% for task 1, and 43.6% and 50.2% for task 2. Used **Python**, **NumPy**, **scikit-learn** and **Keras/TensorFlow**.

## Leadership and Awards

- U-LINK Predoctoral Fellowship (\$40,000 per year, 3-years), University of Miami** (Aug 2019 – Present): selected as one of two recipients from a pool of 41 graduate student applicants across three UM campuses based on the merits of a proposed interdisciplinary project, team of mentors from Computer Science and Sociology and potential societal impact.
- U-LINK Phase 1 Grant (\$40,000), University of Miami** (Jan – Aug 2019): selected as the only graduate student team member listed on a U-LINK interdisciplinary Phase 1 grant out of 7 awarded faculty team projects for proposing to link criminal sentencing disparities with arrestees' physical characteristics in Miami-Dade County using machine learning. (\$10,000 to Dass)

## Programming Languages and Technologies

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

## Technical Documents\*\*\*

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\*\*\*[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.