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# Rahul Kumar Dass

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## Education

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### 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.]*

## Research Projects

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- **Just Face-MDC** (Aug 2019 – present): achieved greater algorithmic fairness across seven fine-tuned deep learning models by improving race and ethnicity classifications for four-subgroups by 12.51% to 22.15% after analyzing 14,000 Miami-Dade County mugshots using a sociolegal rating survey compared to a US Census Hispanic Surname list for annotating missing Latinx and non-Latinx ethnicity labels in arrest forms. Used **Python** and **fastai/PyTorch**.
- **Deep Facial Profiling** (Jan 2019 – July 2019): found evidence for racial/ethnic classification bias after fine-tuning VGG-16 and VGG-Face deep learning models using random mugshot samples from Miami-Dade County based on (1) two-race groups (Black and White) obtaining 85% and 93.7%, and (2) four-race/ethnicity subgroups (Black Latinx, Black non-Latinx, White Latinx, White non-Latinx) obtaining 43.6% and 50.2% accuracies. Used **Python** and **Keras/TensorFlow**.

## Experience

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### University of Miami

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

Coral Gables, FL  
January 2018 – May 2019

- Installed and configured a cluster (1-head node and 32-compute nodes) from scratch to create an **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 submitted 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

- Held lab/office hours to assist undergraduate students with Computer Science course concepts including Intro. to Artificial Intelligence, Java Programming and Networking and Security. Used **bash scripts**, **Makefiles** to help automate grading.
- Conducted practical lab sessions for programming languages including **C**, **Java** and **Javascript/HTML** for > 50 students.

#### Summer Research Assistant - Department of Sociology

May 2018 – July 2018

- Improved manual data preprocessing by linking 194,393 mugshots' jail number IDs with their court records using **Python scripts** and **Linux tools**. Created a randomized dataset of 14,000 mugshots based on demographic metadata to be annotated by student raters for an interdisciplinary research proposal that was successfully awarded a \$40,000 grant.

## Fellowships and Awards

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- **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): responsible for detailing a deep learning pipeline to link arrestees' physical characteristics with their criminal sentencing outcomes to show racial disparities within Miami-Dade County, mentioned as an equal contributor despite being a Ph.D. student as part of a 4-faculty member team.

## Programming Languages and Technologies

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

## Talks and Workshops

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- “Beyond Black and White: Assessing Deep Learning-based Face Classifications by Considering Race and Ethnicity as a Multidimensional Physical Characteristic” Will present my on-going research at the Ph.D. Student Talk Series, Department of Computer Science. University of Miami. April 6, 2020.
- “Facial Recognition, Ethnical Considerations and Social Responsibility” Invited panel discussion with Miami-based community stakeholders Lucas Hernández – Director at Microsoft Philanthropies, Eldys Diaz – Executive Technology Officer to the Chief at City of Miami Police Department, and Brian Brackeen – Managing Partner of Lightship Capital and founder of Kairos. School of Engineering and Technology, Miami-Dade College – Eduardo J. Padron Campus. November 14, 2019. <https://bit.ly/32QGOuC>
- “Ethical Implications of the Adoption of Facial Recognition Technology” Invited workshop to conduct a case-study role play scenario with 100 honors students. School of Engineering and Technology, Miami-Dade College – Eduardo J. Padron Campus. November 14, 2019. <https://bit.ly/32SoC3E>
- “Gigabytes for Good” invited co-presentation with Dr. Nick Petersen (advisor). Center for Computational Sciences Social Systems Informatics Lecture Series. University of Miami. November 1, 2019. <https://bit.ly/2TojYaI>
- “Agent Skill Learning and Keepaway using Parameterized Policy Search” Ph.D. Student Talk Series, Department of Computer Science. University of Miami. March 26, 2018.

## Conference Publications

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Rahul K. Dass, Nick Petersen, Ubbo Visser, and Marisa Omori. “It’s Not Just Black and White: Classifying Defendant Mugshots Based on the Multidimensionality of Race and Ethnicity.” *17th Conference on Computer and Robot Vision (CRV)*, February 2020 - under review

## 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.]

- Dass R., *Q-Learning: Tabular to Neural Networks*. ECE 753 – Final Report, University of Miami, 2018.
- Dass R., Ma L., and Manolovitz B., *Reinforcement Learning: Navigating mazes using SARSA*. ECE 648 – Project 3, University of Miami, 2018.
- Ma L., Manolovitz B., and Dass R., *Radial Basis-function Network*. ECE 648 – Project 2, University of Miami, 2018.
- Ma L., Manolovitz B., and Dass R., *Linear Classification: Perceptron vs WINNOW*. ECE 648 – Project 1, University of Miami, 2018.
- Dass R., *Decision Tree Learning – An implementation and improvement of the ID3 algorithm*. CS 695 – Final Report, Indiana State University, 2017.
- Dass R., Mukherjee A. and Banerjee S. *Student Java Online Documentation*. PGDSE – Advanced Java Project, Jadavpur University, 2013.
- Dass R., *Library Automated System*. PGDSE – Visual Basic.Net Project, Jadavpur University, 2013.
- Dass R., *Quantum Field Theory II*. PHYS 451 – Master of Physics Thesis, Lancaster University, 2013.
- 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.
- Dass R., *Symmetry in quantum mechanics through group theory and its representations*. PHYS 372 – Mini-project II, Lancaster University, 2012.
- Dass R., *The variational method and applying the perturbation theory to derive the Fermi-Dirac Distribution*. PHYS 371 – Mini-project I, Lancaster University, 2011.