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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)**

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.]

Research Projects

- ***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

University of Miami Coral Gables, FL
Graduate Research Assistant - *Department of Computer Science* 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

- **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

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

Talks and Workshops

"Beyond Black and White: Assessing Deep Learning Facial Classifications by Considering Race and Ethnicity as a Multidimensional Physical Characteristic" PhD. Student Talk Series, Department of Computer Science. University of Miami. April 6, 2020.

"Facial Recognition, Ethical Considerations and Social Responsibility" invited panel discussion with Miami-based community stakeholders including Microsoft Philanthropies, Miami Police Department, and Kairos; followed by case study workshop on "Facial Recognition Adoption" with 100 honors students. Miami Dade College. November 14, 2019.

"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.

"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

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." *Proceedings of the 17th Conference on Computer and Robot Vision*, 2020. DOI 10.1109/CRV50864.2020.00039, IEEE Xplore, pp. 238-245.

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.]

- 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.