SHREYAS SUNDARA RAMAN

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COMPUTER SCIENCE (ML & Data Science Specialization)

Seeking to solve unexplored problems using computer vision, reinforcement learning, machine-learning and data-science

EDUCATION

Brown University, Rhode Island, U.S.A *September 2019 - May 2023*
ScB. Computer Science; Junior
GPA: 4.0/4.0

Computer Science Courses	*My Average*	*Letter Grade*
CSCI0150 : Introduction to Object-Oriented Programming	94.8%	A
CSCI0160 : Introduction to Algorithms & Data Structures	94.2%	A
CSCI1870 : Cybersecurity & Ethics	N/A	A
CSCI0330 : Introduction to Computer Systems	95.5%	A
CSCI1470 : Deep Learning	99.6%	A
CSCI1420 : Machine Learning	99.1%	A
CSCI1951A : Data Science	96.6%	A
CSCI0220 : Introduction to Discrete Structures & Probability	106.5%	A
CSCI1970 : Independent Study [Prof. Thomas Serre]	N/A	A
CSCI1430 : Computer Vision	102%	A
CSCI2951F : Learning & Sequential Decision Making [grad level]	100%	A
CSCI2951X : Reintegrating AI [grad level]	N/A	A
CSCI1460 : Computational Linguistics	98.9%	A
CSCI1805 : Computers, Privacy & Freedom	N/A	A
CSCI1970 : Independent Study [Prof. Stefanie Tellex]	N/A	A

Engineering & Mathematics Courses	*My Average* | *Class Average*	*Letter Grade*
ENGN0030 : Introduction to Engineering	99.9% | 89.7%	S* [S/NC]
ENGN0040 : Dynamics & Vibrations	95.2% | 85.6%	A
MATH0200 : Multivariable Calculus	93.8% | 88.1%	A
MATH0520 : Linear Algebra	98.9% | N/A	A
APMA0350 : Applied Ordinary Differential Equations	97.7% | 93.3%	A
APMA1650 : Statistical Inference I	95.6% | N/A	A

Additional Courses	*My Average* | *Class Average*	*Letter Grade*
LITR0110B : Poetry I	N/A | N/A	S [S/NC]
EEPS0810 : Planetary Geology	94.5% | 82.2%	S* [S/NC]

S* = distinction in satisfactory/no-credit courses | N/A = *project-based* courses or where *class average* not calculated

Dubai International Academy, Dubai, U.A.E. *September 2009 - May 2019*
International Baccalaureate Diploma Program
Subjects: Mathematics HL, Physics HL, Chemistry HL, English SL, Spanish B SL, Geography SL; Extended Essay in Physics
Final IB Score: 44/45

Academic Accomplishments

Valedictorian, Class of 2019: IB DP Examinations (44/45 across 6 subjects)	*June 2019*
Academic Achiever of the Year, 11th Grade	*June 2018*
Valedictorian, Class of 2017: IB MYP Examinations (56/56 across 8 subjects)	*June 2017*
GATEWAY (gifted student program): Student of the Year	*June* 2016

Additional Academic Background

ACT with writing (34/36)	*July 2018*
Subject SATs: Math II SAT (800/800) | Physics SAT (800/800)	*August 2018*
Breakthrough Junior Challenge *(Khan Academy):* Top 10% among 3000+ entries, 131 countries	*August 2016*

PUBLICATIONS

Planning Using Large Language Models via Corrective Re-Prompting (under Prof. Stefanie Tellex) *Spring 2022*
First Author | Accepted into FMDM workshop @ NeurIPS | *Python: PyTorch, OpenAI GPT-3, Virtual Home*

- A closed-loop planner that embeds pre-condition errors into prompts as a source of contextual information, and utilizes world knowledge of LLMs to generate corrective actions; the best prompting strategy generated 98% executable plans with 40% human-evaluated "correctness" and high inter-annotator agreement

Development of a CNN for GPD Classification in Cardiac Arrest Patients (with PhD Student Syphong Ha) *Summer 2022*
Acknowledgement: Code Development | Published to Brown University Archives | *Python: PyTorch, 1D CNN, Signal Processing*

- Helped develop a 1D-CNN with L2 regularization to classify time-series EEG signals as *GPD* or *non-GPD*; the best performing hyperparameters achieved >97% accuracy and F1 score

Learning Disentangled Representations for RL by Constructing Factored MDPs (under Prof. Konidaris) *Spring 2022*
Co-Author | Manuscript in Preparation | Dreamer V2 (Google Brain) | *Python: Tensorflow, DreamerV2*

- Modifying Dreamer V2 to utilize disentangled representations for faster learning and higher discounted reward

Dog's Real World Visual Environment *Summer 2021*
Co-Author | UTRA Award Recipient | Manuscript in Preparation | *Python: Tensorflow, CV2, matterport*

- Led the comp. vision team with the objective of tracking eye-fixations and correlating visual behavioral of dogs
- Curated a dataset of 35k+ images from eye-tracking cameras spanning 250k+ instances across 33 classes; performed cross-domain transfer learning using Mask-RCNN; achieved 84% mean area coverage, 60% avg. IoU over target classes and 0.04 average chi-square distance

WORK & RESEARCH EXPERIENCE

Head Teaching Assistant: Artificial Intelligence, CS1410 *Fall 2022*
Working with Prof. George Konidaris, supporting 120+ students and managing 20+ TA staff

- Working to improve course content with the professor, automating systems for assignments and coordinating
- Mentoring 10+ students on developing novel heuristics towards a final project (adversarial zero-sum game)

Machine Learning Engineer, Wisdomise (www.wisdomise.io) *Summer 2022*
Optimizing Liquidity Provision on UniswapV3 using ML | *Python: GraphQL, scikitlearn, web3.py, TheGraph Protocol*

- Applied multilinear, polynomial, SVM and xg-boost regression models to optimize high and low ticks for liquidity provisioning in order to maximize active time and fees earned.The best approached achieved tick range accuracy of >95% and tick-range utility of >98% with an MSE on the order of 10^{-4}
- Scraped UniswapV3 transaction data (80 features on the BTC/WETH pool) using graph protocol and smart contract data

Blockchain Developer, Rario (www.rario.com) *Summer 2022*
Worked with CTO to develop a P2P (web-3) Messaging Platform | *Solidity: Smart Contracts, HTML/CSS, Javascript, Hardhat*

- Worked directly with the CTO of this fast scaling venture (US$120m funded) on building a custom messaging platform leveraging blockchain for storage and transparency
- Built fully functional smart contracts to manage platform backend and deployed smart contracts on Polygon (Mumbai)

Teaching Assistant: Graduate-level Data Science Course, DATA1030 *Fall 2021*
Supporting 50+ students via virtual TA hours | Grading

- Holding weekly TA hours & mentoring 14 grad students on Machine Learning (ML) final projects

Serre Labs: Research Intern *Fall 2020*
Image Classification & Generative Modeling | Paleobotany (Family Identification) AI | *Python: Selenium, requests, sqlite3, Pandas, Tensorflow*

- Expanded existing leaf datasets 8× by adding 300,000+ new images mainly of mounted leaf specimens, with unique ids and taxonomical details. New data improved model classification accuracy to >80%
- Cycle-GAN Model | *Python (Tensorflow):* worked with grad students to enhance a Cycle-GAN model between leaf and fossil image domains; used to generate training examples in the fossil domain

Yahsat Space Lab: Research Intern *June 2017 - March 2019*
The only high school student accepted into a selective program for graduate students; explored satellite design, energy-budget calculations and orbit efficiencies of CubeSats. Supported the Professor in developing models/resources for incoming students

McKinsey & Company, Dubai, U.A.E: Job Shadowing *May 2017*
Job Shadowing a Research Analyst. Worked on short research pieces: country trade-profiles, efficiency of car rentals

PROFICIENCY & PROJECTS

Python: *Highly Proficient* | sqlite3, Pandas, matplotlib, sklearn, Kivy, pytorch, tensorflow, functional programming

- Zebra-horse CycleGAN, Faster-RCNN for traffic sign detection, Pose-Estimation models for ASL hand-sign classification, LSTM/GRU for (french-english) translation, semantic parsing: natural language to SQL, DQN on CartPole
- Regression and hypothesis testing (sklearn) correlating AirBnB and local housing prices in NYC

Java: *Proficient* | multi-threading, JavaFX (applets and AWT)

- Classical games e.g. Tetris, Doodle Jump, Fruit Ninja; genetic algorithm based neural network for learning Flappy Bird
- Graph and decision-tree algorithms [Dijgstka, Prim-Jarnik, PageRank] and SeamCarve implementation

C: *Moderately Proficient* | multithreading, signals, signal safety, I/O registers [stdin, stdout], read-write locks

- Shell: a Bash Unix shell that parses input commands [pwd, ls, chdir etc.] and executes with appropriate error-handling
- Malloc + Database: interactive program allowing clients to add, query, sort, remove and print a database (handled/hosted by a server socket) using multi-threaded processes; implemented with signal handling, thread safety and read-write locks

HTML, CSS & Python-Django: *Highly Proficient* **|** CSS stylesheet; slider, gallery, image effects

- Back-end web server and storage: SQL database connection (with Django) and standard queries (editing, conditionals, join-operation), structured SQL data display in HTML, loading and saving files with Django

React, Tailwind-CSS: *Beginner* | React 'Components', stylization using tailwind-CSS

- Built a cross-device responsive personal website e.g. HTML animation, tagging schemas

SQL & SQLite: *Proficient* | SQL syntax, table JOINS and merges, searching, filtering and sorting

- Loading data onto and fetching data from SQL database; connecting and serving SQL data to an HTML webpage

Javascript: *Moderately Proficient* | d3 + SVG elements: transformation, tool tips; importing csv data

- Data Dashboard: stylized graphs, pie-charts and scatter plots (with summary tooltips) hosted on a HTML page with interactive text/button inputs to filter displayed data or perform scatter point regression in real-time [with animation]

MATLAB + SolidWorks (CAD): *Proficient* **|** MATLAB: systems of equations, excel output, graphical outputs | SolidWorks: image imports, part assembly and engineering-drawings

- Intelligent kinematically accurate predator-prey simulation; COVID-19 infection spread (SIR model) simulation
- Generated 3D printed models of designs; constructed bridge/truss structures and a bottle-opener design

Solidity & Smart Contracts: *Proficient* | contract creation, mappings, keccack256, contract deployment, integration with hardhat

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INTERESTS & VOLUNTEERING

Meiklejohn Mentor	Selected to be a peer advisor to an amazing group of incoming freshmen (Class of 2024) advising on course choices, industry and research etc…
Brown Space Engineering	Member of BSE avionics and manufacturing divisions. Learned to use circuitry softwares (EAGLE) and explored introductions to Boolean Logic and Logic Gates
Chess	Founder of high school chess club; Coached 25+ members and lead team to win 3 consecutive inter-schools; FIDE Chess Federation member; 2nd place in Ivy League Spring Tournament
STEMS Tutoring Program	Tutored students at a public high school (Hope High School, Providence, RI) once a week; Taught high school physics and SAT preparation to students after-school hours
Math Acceleration Group	Initiated a mentorship program for high-potential juniors to help meet their HL aspirations. Many of the 20+ students have now been able to meet their goal.
Poetry	Wrote and published a collection of 25 poems - influenced by global events that impacted my childhood and youth
Duke of Edinburgh Award	DoE Silver Award
Founder, Inspire Science	Founded and ran a science website and blog (https://inspirescienceclub.com/) during senior school; with extensive followership and active publications on science in real life
Languages	English (native fluency), Spanish (medium fluency), Tamil (mother tongue)