

UNNIKRISHNAN MENON

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🎓 Education

M.Tech in Artificial Intelligence and Machine Learning 04/2023 – Present
Birla Institute of Technology and Science, Pilani - India

B.Tech in Electrical and Electronics Engineering 07/2017 – 06/2021
Vellore Institute of Technology, Vellore - India
CGPA: 8.63/10

Class 12 Board (CBSE) 2017
Summer Fields School, New Delhi
Academic Score: 94.2%

Class 10 Board (CBSE) 2015
Summer Fields School, New Delhi
Academic Score: 10 CGPA

⚙️ Technical Skills

Programming Languages	Python, C/C++, Javascript, HTML, C#, CUDA
Reinforcement Learning	Stable Baselines 3, OpenAI Gym
Deep Learning Frameworks	Tensorflow, Keras, Pytorch, ONNX, RavDL
Simulation Packages	Unity3D, Pymunk, Pygame
Microcontrollers	Arduino, Raspberry Pi, Jetson Nano, 8051, FPGAs
Backend Development Tools	SocketIO, Flask, FTP, Requests
Database Toolkits	Sqlalchemy
Mathematical Packages	MATLAB, R
Typesetting Software	L ^A T _E X

💼 Work Experience

Machine Learning Engineer II (*Full-Time*) 08/2022 – Present
Raven Protocol Pte Ltd., Singapore

- Revamped the Ravenverse ecosystem by introducing Selective-Participation, a feature that lets Providers stake Raven Tokens and participate in specific ongoing Requester Graphs and get rewards. Handled various edge-cases like computation of failed subgraphs, disconnection, token stashing, re-proportioning op shares etc.
- Implemented Transformer and GPT-2 based Chatbot on Ravenverse from scratch using the Requester libraries (Ravop & RavDL).
- Enhanced the Provider library (Ravpy) for Pytorch Backend compatibility with GPU acceleration support during model training.
- Developing a Functional API for RavDL v2 that offers more flexibility and control over the DL layers.

Machine Learning Engineer (*Full-Time*)
Raven Protocol Pte Ltd., Singapore

08/2021 – 08/2022

- Added support for saving/loading Deep Learning models in the Open Neural Network Exchange (ONNX) format so that developers can import/export their trained models from RavDL to other frameworks like Tensorflow, Pytorch, Keras, Caffe2 etc.
- Built a Graph Compile-Execute Mechanism from scratch using which a developer can choose which Ops/results they selectively want to save post-execution. Added features for visualizing progress of ongoing training sessions and estimated cost of training in Raven Tokens.
- Working on Raven Protocol's Distributed Deep Learning tool that provides essential abstractions for training complex Deep Learning architectures in the Ravenverse.
- Developed a Python SDK that allows Contributors to intuitively participate in any ongoing MLOPs graph computations in the Ravenverse and get Raven Token rewards in return.
- Implemented an advanced scheduling algorithm that breaks down a Developer's ML model into concurrently computable Operations, and emits them to Contributors across the world based on their available compute power. This paradigm facilitates faster and cheaper training of deep learning models.
- Built a secure and scalable industry-standard Federated Learning Framework from scratch. Added a layer of Homomorphic Encryption for data privacy.

Machine Learning Intern
Raven Protocol Pte Ltd., Singapore

05/2021 – 08/2021

- Implemented and documented a collection of ML algorithms like Regression Models, KNN, SVMs, K-Means, Perceptron and Decision Trees using Raven Distribution Framework.

AI Developer Intern
MellonAI, Chennai, India

12/2019 – 05/2020

- Worked on multiple CV projects including Head-Pose Estimation, Deep Facial Recognition, and Emotion Detection.

Extracurricular

Technical Lead of Electrical Department
RoboVITics, the official robotics club of VIT

02/2019 – 02/2020

- Led an engineering team of enthusiasts to the successful completion of several projects involving Control Systems, Robotics, Electronics, Mechanical Designing, Artificial Intelligence, IoT, and other technologies.
- Conducted Workshops and taught students about everything they need to know for starting a career in robotics and assisted them in building their own robots.

Motor Driver Circuit Designer
Team Orcus

07/2018 – 01/2020

- Designed a 120 lbs combat robot that Finished in top 7 internationally at RoboWars, TechFest'18, IIT Bombay
- Secured 3rd position in RoboWars, Kurukshetra'19, Anna University

Core-Committee Member
RoboVITics, the official robotics club of VIT

12/2017 – 02/2019

- Successfully completed multiple robotics projects involving Machine Learning, Computer Vision, Artificial Intelligence, IoT etc.

✂ Projects

View all Demonstrations on my Portfolio Website: 7entropy7.github.io

Racer AI

07/2022 – 09/2022

- An OpenAI Gym style environment that allows you to create custom racing tracks with checkpoints, and train a car to navigate through them. Trained a PPO agent using Stable Baselines 3 to navigate through various custom race tracks. Then utilized the trained expert agent to help a novice agent traverse a new track using Imitation Learning (DAgger algorithm).

Rummy AI

08/2021 – 11/2021

- This AI deploys a Federated Learning Architecture built from scratch with SocketIO to train a Reinforcement Learning agent based on Proximal Policy Optimization (PPO) that can learn to take risks and play the classic Gin Rummy card game.

AI Agents for Video Games

10/2018 – Present

- Agent that learns to play Ball Blast Game using DDPG algorithm.
- Nokia Snakes Game using Deep Q-Networks.
- SuperMario Bros speedrun with Neuro-Evolution.
- Cooperative multi-agent Pong game environment that uses NEAT Genetic Algorithm.
- PacMan AI: A better way to train RL models by incorporating autoencoders to reduce the dimensionality of the environment frames.
- AI for obtaining multiple solutions to the Puzzle-8 game.
- Self-Learning Chrome Dino Game with genetic algorithm.

Cypher – VR Surveillance Robot (*Capstone Project*)

02/2021 – 05/2021

Advisor: Dr. P. Mahalakshmi

- Designed and implemented a remote surveillance robot which can be deployed for search operations in alien environments. Integrated a gaming controller and Virtual Reality interface for control and vision. [Thesis](#)

Navscape – An Indoor Navigation Paradigm

09/2020 – 10/2020

- NavScope is an ingenious Reinforcement Learning based algorithm that uses CCTV footage data in conjunction with existing methodologies to prepare public institutions to sustain in a post-covid world.

Self learning Quadruped

03/2020 – 04/2020

- Augmented Random Search Algorithm based AI that teaches a robotic quadruped to walk.

Sudoku Vision

01/2020 – 02/2020

- An application that can detect sudoku puzzles placed in front of a camera and solves them in real time automatically.

Path Prediction for Smart Vehicles

09/2019 – 10/2019

- A Path Prediction Algorithm which forecasts future path taken using RNN–LSTMs and on top of that optimizes the predicted trajectory using Deep Q-Learning Algorithm.

Rap lyrics generator using LSTMs

02/2019 – 03/2019

- LSTM model that imitates the style of a given rapper and generates rap lyrics based on a seed user input.

- This robot uses the Deep Q Networks algorithm to choose the best strategy for manipulating a robotic arm to crawl on any surface and move forward, regardless of its orientation.

Prepaid Energy Credits based Power Distribution System

01/2019 – 02/2019

- Machine learning based algorithm for predicting power usage in a common household. Later integrated to work with an Raspberry Pi based smart energy meter.

Autonomous Rubik's Cube Solver

02/2018 – 04/2018

- Developed an algorithm in under 800 lines of C++ code that predicts the correct moves to solve a scrambled $3 \times 3 \times 3$ Rubik's Cube.

Publications

- [1] A. Bhowmik and U. Menon, "An adaptive cryptosystem on a finite field," *PeerJ Computer Science*, vol. 7, e637, 2021.
- [2] U. Menon and A. Menon, "An efficient application of neuroevolution for competitive multiagent learning," *Transactions on Machine Learning and Artificial Intelligence*, vol. 9, no. 3, pp. 1–13, May 2021. DOI: 10.14738/tmlai.93.10149. [Online]. Available: <https://journals.scholarpublishing.org/index.php/TMLAI/article/view/10149>.
- [3] U. Menon, A. R. Menon, A. Hudlikar, A. Sharmila, and P. Mahalakshmi, "A hybrid autoencoder architecture for text encryption," in *2021 Innovations in Power and Advanced Computing Technologies (i-PACT)*, 2021, pp. 1–7. DOI: 10.1109/i-PACT52855.2021.9696715.
- [4] A. Bhowmik and U. Menon, "Dragon crypto – an innovative cryptosystem," *International Journal of Computer Applications*, vol. 176, no. 29, pp. 37–41, Jun. 2020, ISSN: 0975-8887. DOI: 10.5120/ijca2020920331. [Online]. Available: <http://www.ijcaonline.org/archives/volume176/number29/31386-2020920331>.
- [5] A. Bhowmik and U. Menon, "Enhancing the ntru cryptosystem," *International Journal of Computer Applications*, vol. 176, no. 29, pp. 46–53, Jun. 2020, ISSN: 0975-8887. DOI: 10.5120/ijca2020920320. [Online]. Available: <http://www.ijcaonline.org/archives/volume176/number29/31388-2020920320>.
- [6] A. Bhowmik and U. Menon, "Mes – modern encryption standard," *International Journal of Computer Applications*, vol. 176, no. 36, pp. 21–27, Jul. 2020, ISSN: 0975-8887. DOI: 10.5120/ijca2020920479. [Online]. Available: <http://www.ijcaonline.org/archives/volume176/number36/31435-2020920479>.
- [7] U. Menon, A. Hudlikar, and D. Panda, "Scytale - an evolutionary cryptosystem," *International Journal of Computer Science and Network*, vol. 9, no. 4, pp. 153–159, Aug. 2020, ISSN: 2277-5420. [Online]. Available: <http://ijcsn.org/articles/0904/Scytale-An-Evolutionary-Cryptosystem.html>.
- [8] U. Menon, A. R. Menon, and A. Hudlikar, "A novel chaotic system for text encryption optimized with genetic algorithm," *International Journal of Advanced Computer Science and Applications*, vol. 11, no. 10, 2020. DOI: 10.14569/IJACSA.2020.0111005. [Online]. Available: <http://dx.doi.org/10.14569/IJACSA.2020.0111005>.
- [9] U. Menon and D. Panda, "Design and evaluation of electric bus systems for metropolitan cities," *SSRG International Journal of Mechanical Engineering*, vol. 7, no. 10, pp. 16–23, Oct. 2020, ISSN: 2348 - 8360. [Online]. Available: <http://www.internationaljournalssrg.org/IJME/paper-details?Id=337>.

Achievements

Top 15 Finalist in MakeMIT 2021	03/2021
– <i>Worked on the hardware and motion-planning algorithm for a creative and compact wall painting robot that harnesses the power of vacuum and IoT to help make your walls beautiful.</i>	
Winner of Urban Innovation Track at HackMIT 2020	09/2020
– <i>Deployed a Reinforcement Learning based solution for project Navscape that helps with navigation within buildings and indoor environments where GPS is unavailable.</i>	
Winner of HackerTech 2019	12/2019
– <i>Secured First Position in this 24 hr long Hackathon where I worked on project SPARC (Smart Power Allocation using Reinforced Clusters).</i>	
Winner of VIT Hack 2019	09/2019
– <i>Won VITHack organized by VIT University in collaboration with Honeywell</i>	
Special Mention Prize in Access Denied Hackathon 2019	03/2019
– <i>Got Special Mention prize in Logistics and Transportation from GitHub.</i>	
Winner of Developer's Sprint of Code Hackathon by CodeChef	02/2019
– <i>Secured the First Position in this 36 hour Hackathon. I worked on the hardware and a facial emotion recognizer for a Comprehensive Electoral Solution Suite.</i>	
Quora Top Writer 2018	01/2018
– <i>Got the coveted Top Writer's Quill on my Quora profile for writing quality technical content. Got New York Time's subscription and a t-shirt as a reward from Quora</i>	
Made 6 Near-Earth Object Observations	2016
Issued by International Astronomical Search Collaboration (IASC)	
– <i>Used Image-Stacking technique with Astrometrica software to detect potential asteroids from data collected by the Campus Observatory at University of Illinois. Ended up spotting 6 Near-Earth Objects.</i>	

References

Mr. Kailash Ahirwar
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Dr. P. Mahalakshmi
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School of Electrical Engineering (SELECT)
Vellore Institute of Technology, Vellore
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