UNNIKRISHNAN MENON

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Education

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 Frameworks	Stable Baselines 3, OpenAI Gym
Deep Learning Frameworks	Tensorflow, Keras, Pytorch, ONNX
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	LaTeX

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.

Work Experience

Machine Learning Engineer *(Full-Time)* 08/2021 – Present
Raven Protocol Pte Ltd., Singapore

- 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 05/2021 – 08/2021
Raven Protocol Pte Ltd., Singapore

- 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 12/2019 – 05/2020
MellonAI, Chennai, India

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

Extracurricular

Technical Lead of Electrical Department 02/2019 – 02/2020
RoboVITics, the official robotics club of VIT

- 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 07/2018 – 01/2020
Team Orcus

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

Core-Committee Member 12/2017 – 02/2019
RoboVITics, the official robotics club of VIT

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

Achievements

Top 15 Finalist in MakeMIT 2021 03/2021

– *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.*

Winner of Urban Innovation Track at HackMIT 2020 09/2020

– *Deployed a Reinforcement Learning based solution for project Navscape that helps with navigation within buildings and indoor environments where GPS is unavailable.*

Winner of HackerTech 2019 12/2019

– *Secured First Position in this 24 hr long Hackathon where I worked on project SPARC (Smart Power Allocation using Reinforced Clusters).*

Winner of VIT Hack 2019 09/2019

– *Won VITHack organized by VIT University in collaboration with Honeywell*

Special Mention Prize in Access Denied Hackathon 2019 03/2019

– *Got Special Mention prize in Logistics and Transportation from GitHub.*

Winner of Developer's Sprint of Code Hackathon by CodeChef 02/2019

– *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.*

Quora Top Writer 2018 01/2018

– *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*

Made 6 **Near-Earth Object Observations** 2016
Issued by International Astronomical Search Collaboration (IASC)

– *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.*

Projects

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

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

- NavScape 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.

Self Learning Crawler Robot 12/2018 – 02/2019

- 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.

References

Dr. P. Mahalakshmi, Professor
Department of Instrumentation
School of Electrical Engineering (SELECT)
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Dr. Rashmi Ranjan Das, Associate Professor
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University of Central Florida
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