Viswesh Nagaswamy Rajesh

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EDUCATION

University of California San Diego **Sep 2024 - May 2026**
Master of Science in Electrical and Computer Engineering (Intelligent Systems, Robotics & Control)
Coursework: Stastical Learning*, Linear Systems Theory*, Game Theory and Multi-Agent Systems*

Indian Institute of Technology Kharagpur **Dec 2020 - May 2024**
Bachelor of Technology in Electrical Engineering *GPA: 8.68/10 (top 10%)*
Coursework: Reinforcement Learning, Deep Learning, AI, Digital Signal Processing, Stochastic Processes
Achievements: Winner, Inter IIT Tech Meet 12.0 | MITACS '23 | DAAD Wise '23 (offered) | IITKGPF '22

EXPERIENCE

Toronto Intelligent Systems Lab University of Toronto
Guide: Prof. Igor Gilitschenski *May 2023 – Apr 2024*
- Developed a novel **latent space optimization**[1] method for dynamics estimation of UGVs in unforseen environments
- Improved offline training with a novel **sliding-window loss function** to outperform LSTM-RNN baselines by **18.4%**

Mechanical Systems Control Lab UC Berkeley
Guide: Prof. Masayoshi Tomizuka *Dec 2022 – Jun 2023*
- Proposed the **Influence Index**, a KL-divergence based scalar metric to quantify interaction levels in two-agents games
- Implemented **Population Play** and **Fictious Co-Play (FCP)** to obtain a reward of **124** on meltingpot cooking tasks

Stochastic Robotics Lab IISc Bangalore
Guide: Prof. Shishir Kolathaya *May 2022 – Oct 2022*
- Benchmarked the **Soft Actor Critic** algorithm on Stochlite quadruped in Isaac Gym to achieve a reward of over **350**
- Explored gradient free optimization methods including Augmented Random Search for end-foot trajectory generation

Autonomous Ground Vehicle Research Group IIT Kharagpur
Undergraduate Researcher | [Certificate] | *Prof. Debashish Chakravarty* *May 2021 – Apr 2024*
- Surveyed and implemented semantic segmentation architectures including UNet, ENet and ResNet for lane segmentation
- Inducted the freshman team and conducted reading groups on Reinforcement Learning, Computer Vision and Robotics

PUBLICATIONS

[1] "Adapting to Shifts in Vehicle Dynamics with Online Latent Optimization" [Under Review]
K Chinniah, A Ivanovic, J Lim, **Viswesh N** et al. Conference on Robot Learning (CoRL) 2024
[2] "Entity Augmentation for Efficient Classification of Vertically Partitioned Data with Limited Overlap" Link
A Amalanshu*, **Viswesh N*** et. al GLOW Workshop, IJCAI 2024
[3] "[RE] From Goals, Waypoints & Paths To Long Term Human Trajectory Forecasting" Link
A Shukala*, S Roy*, Y Chawla*, .. **Viswesh N*** et al. ReScience C Vol 8, NeurIPS 2022 poster track

ACADEMIC PROJECTS

Entity Augmentation for Vertical Federated Learning **Dec 2023 – May 2024**
- Developed **Entity Augmentation**[2] for VFL to improve accuracy on CIFAR-10 dataset by **21%** with **5%** data overlap
- Benchmarked the method on the Caltech-7, Handwritten and Parkinsons datasets, achieving a test accuracy of **90-95%**

Adobe Behavior Simulation Challenge | [Github] [Paper] **Oct 2023 - Dec 2023**
- Explored finetuning LLaVA, LLaMA, and NExT-GPT LLMs with Bandit routing to achieve a ROUGE score of **0.25**
- Proposed a transformer-MLP framework on BERT tokens with finetuning to obtain **2262** MSE on KPI prediction

Reinforcement Learning for Bipedal Walking | [Github] **Jan 2023 – Mar 2023**
- Implemented the **DQN, DDQN** and **PPO, TD3** algorithms to solve the LunarLander-v2 and BipedalWalker-v3 envs
- Explored **gradient clipping**, **double Q-learning** and **Advantage Estimation(GAE)** to achieve rewards of over **200**

Machine Learning Reproducibility Challenge 2022 | [Github] **Aug 2022 – Oct 2022**
- Reproduced the results of a paper based on Y Net[3], a class-segmentation pipeline for long term human path prediction
- Proposed a transfer learning experiment to improve over SOTA benchmarks on ETH/UCY and SDD datasets by **15%**

Localization and Mapping of an Autonomous Racing Car | [Github] **Aug 2021 - Aug 2021**
- Used PointCloud and Odometry data from CARLA Simulator and constructed global racing map using Open3D
- Implemented loosely coupled **ICP** to localize the vehicle resulting in an improvement of **20cm** over Odometry data

TECHNICAL SKILLS

Languages: C, C++, Python, MATLAB | **Frameworks**: Git, ROS/ROS2, RViz | **Simulation**: Gazebo, Gym, Meltingpot
Libraries: PyTorch, Numpy, Pandas ,TensorFlow, OpenCV, matplotlib, PCL, wandb, Stable-Baselines, Ray RLLib