Parnika

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EDUCATION

M.Sc, Computer Science (Machine Learning)   Sep 2023 - Jun 2025
Université de Montréal (Mila), Montréal, Québec

B.Tech. Computer Science and Engineering   Jul 2013 - Jun 2017
Dr. A.P.J. Abdul Kalam Technical University, U.P., India

EXPERIENCE

- **Research Intern:** REAL Lab, Mila   May 2024 - Dec 2024
  Supervisor: Prof. Glen Berseth

  Leveraged Bert to encode text descriptions in URDFs for cross-embodiment learning and generalization to unseen morphologies. Implemented a novel tokenization approach and transformer actor-critic to train a single RL policy across multiple morphologies. [Report]

- **Technologist, Wipro Ltd.**, India   Sep 2022 - July 2023

  Developed AI solutions for customers. Worked on model optimization and deployment.

- **Research Collaborator:** Indian Institute Of Science, Bangalore   Oct 2019 - May 2021
  Supervisor: Prof. Shalabh Bhatnagar
  - Developed and implemented an actor-critic algorithm to solve constrained optimization for cooperative multi-agent reinforcement learning.
  - Produced results and included constraints for experiments on 2 benchmark multi-agent environments, viz. Cooperative Navigation and Cooperative Treasure Collection, using an azure cloud virtual machine.

- **Research Engineer, Mindtree Ltd.,** India   Nov 2017 - Aug 2022

  Implemented research papers for customer-specific use cases. Worked on reinforcement learning and computer vision projects for use cases such as Product Recommendation, Airline Seat Inventory and Dynamic Pricing and Fine-Grained Visual Classification among others.

PUBLICATION

P. Parnika*, Raghuram Bharadwaj Diddigi*, Sai Koti Reddy Danda* and Shalabh Bhatnagar. **"Attention Actor-Critic algorithm for Multi-Agent Constrained Co-operative Reinforcement Learning".
AAMAS 2021** [Poster] [Code]
*equal contribution

SELECTED PROJECTS (Industry)

Semantic Segmentation <u>Model Optimization and Deployment</u> for an Autonomous Vehicle
Optimization experiments performed on NVIDIA ORIN board. Optimized the model with TensorRT which increased frames per second(fps) by **3 times** (140 fps**)**.
- Calibrated the pytorch model on 6k images from the training set while converting to the **quantized** TensorRT engine.
- To capture inference time accurately for batch inference on the derived TensorRT model, leveraged cuda Events and synchronize functions.

Explainable Product Recommendations
Learn optimal policy to navigate **product knowledge graph** embeddings and provide most relevant recommendations to a user.

- Reproduced results from pre-existing research.
- Incorporated a graph transformer to learn embeddings of entities and relationships in the product knowledge graph that can capture neighborhood information. The embeddings are trained in an end-to-end manner with the actor-critic RL policy objective.

Fine Grained Visual Classification (FGVC)
Learn fine-grained features to perform **intra-class image classification**.

- Performed FGVC on Stanford-Cars and FGVC-Aircraft datasets with the model architecture NTS(Navigator-Teacher-Scrutinizer). This model learns to propose fine-grained informative regions from the image without the need of bounding boxes as ground truth labels.

SELECTED PROJECTS (Academic)

Offline Reinforcement Learning Leveraged dataset with offline RL to perform the pick and place task in simulation on a 6-DOF WidowX robot. The reward is +1 when the object is placed in the box, and zero otherwise. The dataset consists of unlabeled 10 k grasping attempts and 5k placing attempts labeled with rewards. No trajectory is present in the data that solves the complete pick and place task.

- Trained TD3+BC offline RL algorithm on this dataset. This led to higher success rates than the CQL algorithm in 300 epochs.
- Incorporated pretrained Resnet18 to process image observations instead of CNN. This led to faster, stabler and higher performance than CQL using CNN in 200 epochs.

MultiModal Sarcasm Detection Used MMSD2.0 dataset where an input sample consists of pairs of image and text with the objective to effectively capture the consistencies between these modalities for improved sarcasm detection.

- Incorporated pre-trained LaCLIP for encoding image and text to take advantage of text augmented pre-training. Fine Tuned Vision Transformer(ViT) with LaCLIP embeddings on MMSD 2.0 dataset. This led to 1% improvement in test accuracy and F1 score.

TOOLS AND TECHNICAL SKILLS

Proficient   Python, PyTorch, Numpy, OpenAI Gym, Tensorboard

Familiar   Keras, Azure Cloud services, CometML, TensorRT, Docker, Linux, Singularity