



DWAIT BHATT

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SUMMARY

Graduate researcher in robotics at UCSD with 3 years of AI R&D experience at Samsung Research and ISRO. Specifically interested in reinforcement learning and value alignment to develop helpful and collaborative robots.

SKILLS

Relevant Coursework: ML for Robotics, Sensing & Estimation in Robotics, Visual Learning, Probabilistic Reasoning, Search & Optimization, Information Theory, Deep Generative Models, Linear Systems Theory, Recommender Systems

Programming Languages: Python, Matlab, C++

Libraries: PyTorch, Keras, Numpy, Pandas, Robosuite, OpenCV, Open3D, xArm API

EDUCATION

University of California, San Diego

MS in Electrical & Computer Engineering - Intelligent Systems, Robotics & Control

Expected Graduation: June 2024

San Diego, California

Birla Institute of Technology and Science, Pilani (BITS Pilani)

BE (Hons.) in Electrical & Electronics Engineering - CGPA: 8.29/10

June 2019

Pilani, Rajasthan

EXPERIENCE

Existential Robotics Laboratory

Graduate Researcher

January 2023 - Present

San Diego, California

- Created a sim-to-real pipeline from scratch for executing robosuite policies learned in simulation on a physical robot arm, using data from a RealSense RGBD camera and force-sensing resistors. Successfully executed lift, pick-and-place, and stack policies on an xArm6 robot with sub-5mm error.
- Independently designed and implemented a VR teleoperation system for real-time control of a robotic arm.
- Trained robot manipulation policies to learn from demonstrations using generative adversarial imitation learning.
- Currently enabling transfer learning across robot embodiments via latent policies. A submission to RA-L is in progress.

Samsung R&D Institute India

Senior Machine Learning Engineer

July 2019 - August 2022

Bangalore, Karnataka

- Spearheaded the development of a patented application launch time prediction model, from a python POC to an on-device implementation in C++, which was used to boost CPU for an optimal duration to make application launches 6% faster while extending battery life by 2 hours.
- Automated app launch video analysis using a novel algorithm based on structural similarity between consecutive video frames, saving over 40 man-days annually and significantly enhancing operational efficiency.
- Authored a research paper based on this work and presented it at IEEE IJCNN 2022 held in Padua, Italy.
- Guided a team of four undergraduate students through a sequence prediction project as their mentor for Samsung's industry-academia collaboration program, PRISM.

Machine Learning Engineer

- Designed a reinforcement learning agent that trained on-device to control an Android smartphone's kernel tunables, reducing the decoding time of encrypted models by 10% on Samsung's flagship phones.
- Visualized the agent's performance and automated kernel tunable evaluation to identify an action set with the highest impact on model decryption time.

Indian Space Research Organisation (ISRO)

Research Trainee

September 2021 - January 2022

Ahmedabad, Gujarat (Remote)

- Implemented a deep reinforcement learning network in PyTorch trained using policy gradients to drop non-essential image patches from CIFAR10 data while maintaining classification accuracy of 90%. This work is being extended to satellite and drone images for efficient poverty estimation from remote sensing imagery.

Pixxel

Machine Learning Engineer

August 2018 - December 2018

Pilani, Rajasthan

- Performed semantic segmentation of satellite images with a U-Net to identify roads and buildings with an IoU of 0.7.
- Applied classical image processing algorithms for water body extraction from multispectral satellite images.

PROJECTS

Curiosity-driven Robot Reinforcement Learning | *PyTorch* | UCSD

January 2023 – March 2023

- Introduced curiosity-based intrinsic motivation in a PPO robot policy via Random Network Distillation. Found that naively adding such exploration hurt performance for robotic tasks in contrast to RND's success in playing video games.

Musical Accompaniment Generation using Language Modeling | *PyTorch* | UCSD

April 2023 – June 2023

- Designed a novel architecture for accompaniment generation conditioned on a vocal track using language modeling.
- Achieved semantically meaningful generation (FAD 4.07) with minimal training in contrast to current large models.

Surface Reconstruction using Locally-Aware NeRFs | *PyTorch* | UCSD

April 2023 – June 2023

- Tackled the issue of missing local information in the NeRF architecture by introducing features from a Convolutional Occupancy Network. This enabled smoother surface reconstruction of complex geometries and large-scale scenes.