

# 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)**

**June 2019**

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

*Pilani, Rajasthan*

## EXPERIENCE

**Existential Robotics Laboratory**

**January 2023 - Present**

*Graduate Researcher*

*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.
- Trained robot imitation policies in simulation to learn manipulation tasks from demonstrations using GAIL.
- Currently engaged in transfer learning across robot morphologies by leveraging policies encoded to a latent space.

**Samsung R&D Institute India**

**July 2019 - August 2022**

*Senior Machine Learning Engineer*

*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.
- Saved 10 days per quarter of manual work by creating a python tool to extract user-perceived launch time from app launch videos using a novel algorithm based on structural similarity between consecutive video frames.
- 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)**

**September 2021 - January 2022**

*Research Trainee*

*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**

**August 2018 - December 2018**

*Machine Learning Engineer*

*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.