

Anant Rai

+1 551-998-4741 | anant.v.raai@gmail.com | raianant.github.io | github.com/RaiAnant | linkedin.com/in/anant-rai

EDUCATION

New York University, Courant

CGPA - 3.86

Master of Science, Computer Science

September 2021 - May 2023

Indian Institute of Information Technology, Allahabad, India

CGPA - 9.13/10

B.Tech - Information Technology

July 2017 - June 2021

PUBLICATIONS

On Bringing Robots Home

Nur Muhammad "Mahi" Shafiullah*, **Anant Rai***, Haritheja Etukuru, et al
submitted to **Science Robotics**

November 2023

Open X-Embodiment: Robotic Learning Datasets and RT-X Models

Abhishek Padalkar, Acorn Pooley, Ajinkya Jain, ... **Anant Rai**, et al

in **IEEE International Conference on Robotics and Automation (ICRA)**

September 2023

Teaching a Robot to FISH: Adaptive Imitation from One Minute of Demos

Siddhant Haldar, Jyothish Pari, **Anant Rai**, and Lerrel Pinto

in **Robotics: Science and Systems (RSS)**

February 2023

Predictive Risk Analysis using Deep Learning in Indian Traffic

Rahul Birendra Jha*, **Anant Rai***, Rahul Kala

in **IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC)**

March 2021

Food Recommendation System using Neural Collaborative Filtering & Sentiment Analysis

Tinku Singh, Ashwin Raut, Dhruv Agarwal, Rahul Jha, **Anant Rai**, Manish Kumar

presented at **International Conference on Advancement in Interdisciplinary Research (ICAIR)**

July 2020

EXPERIENCE

AI Resident

1X Technologies

September 2023 - Present

Mountain View, California

- Working with Humanoids to make them capable of working in real-world settings like homes and warehouses
- Scaling end-to-end robot foundation models that can learn both manipulation and navigation policies. Suggested and implemented training changes in existing training framework and architecture design to see roughly 20% improvements in policies involving simultaneous navigation and manipulation
- Developing AI tools, UX and data pipeline engines for operators to use for demo collection and training. Speed up the existing software stack for data processing and training by about 30%
- Testing the robot controllers for accuracy in trajectory execution, regression in performance and bugs. Testing using custom visualization tools and existing tools like foxglove

Graduate Research Assistant

CILVR Lab, NYU

Jan 2022- September 2023

New York, USA

- Working in the field of Robot Learning, advised by Prof. Lerrel Pinto and Soumith Chintala. Using Stretch RE1 robot, to accomplish different tasks like door-opening, drawer-opening, object picking in real-world environments like homes
- Achieved fast learning of complex skills in robots, using less than one minute of human demonstrations, through RL, OT-based rewards and a residual model (Best Student Paper Award at **RSS conference 2023**)
- Fronted my research group to achieve generalization in Imitation Learning in Homes, via policies that can learn in a data-efficient manner and capture multi-modal behaviours based on conditioning
- Experimented with SSL techniques like BYOL, VICReg and MoCo along with pre-trained models like SAM and Dino to get better vision priors for downstream tasks
- Benchmarked and tested iPhone-SLAM for navigation, Lidar-based localization and 3d-scene reconstruction
- My work was recently compiled into paper: **On Bringing Robots Home**, which is archived and currently submitted to **Science Robotics**

Research & Development Intern

Jan 2021 - June 2021

Temasek Lab, Nanyang Technological University

Singapore

- Lead the development of Meeting Room Speech Recognition Android Application, capable of automatic transcription
- Managed scheduled implementation of features and product release, bug tracking, and optimisations of Java app. Suggested improvements on existing implementations resulting in significant performance enhancement
- For real-time updates and synchronization, used Live Data and Observers with API (Retrofit) and sockets to achieve efficient interfacing between UI and the backend
- Additionally implemented and trained image-captioning model using transformer and hosted on flask server for MAGOR live video captioning

Remote Research Assistant

July 2020 - April 2021

CITEC Lab, Bielefeld University

Bielefeld, Germany

- Implemented Value Iteration Network, a Deep RL based approach, for prediction and planning to solve physics based puzzles
- Devised optimal environment representation using trees and graphs for intelligent cost calculation and re-routing decisions in the environments of NeurIPS2020: Flatland challenge (multi-agent reinforcement learning on trains problem)
- Using Conflict Based Search (CBS) and Deep-Q learning achieved one of the best results in the competition (6th place)

Data Science Intern

Summer 2019 & 2020

LYTiQ - GmbH

Dusseldorf, Germany

- Used Deep Learning approaches to solve various problems like NSFW detection and filtering, tyre tread depth estimation (for checking safety and usability) and important field extraction from verbose documents
- Developed an app for document submission on MS Teams that interacted with users through a server-less python bot
- Designed a pipeline for the above app that would parse the documents (using OCR and NLP) submitted to the bot and store the extracted information to Cosmos DB (Azure). This helped to digitize paper-based data and increase the efficiency by more than 100%

TECHNICAL SKILLS

Languages: Python, Java, C/C++, Kotlin, Matlab, SQL

Tools & Platforms: Pytorch, ROS, Fastai, Keras, Tensorflow, Android Studio, Firebase, Azure, GCP, Spring Boot

PROJECTS

Risk Analysis using Trajectory Prediction in Indian Traffic *(collaboration with University of Maryland, College Park)*

- Built a module using SSD (45 mAP) and SORT to detect and track agents in novel video dataset of Indian Traffic
- Developed special LSTM based network architecture to learn the agent's behaviours and interactions for trajectory prediction in dense heterogeneous traffic
- Devised Weighted-Elliptical-Model for risk modelling and combined it with trajectory prediction to get novel predictive-risk-analysis (20% improvement over baseline). Research publication was presented at **IEEE ITSC 2021**

OxyTracker

- Developed Android app, for tracking and controlling Oxygen Cylinder supply chain for government in Haryana, India during covid
- Worked on Firebase backend to build realtime-database for storage and authentication
- Built UI and app-logic for features like QR-scanner, unique ID generation and interface for Firebase database using Kotlin
- Ensured timely oxygen supply to homes and patients, greatly improving the supply-demand balance during the COVID-19 crisis in Haryana, India

ACHIEVEMENTS & EXTRACURRICULAR

- Paper FISH won the best student paper award at RSS 2023
- 1st in App-Development competition at IIIT Allahabad
- Runner-up in Prototype Hackathon (IIIT Allahabad)
- App-Operations Member of Asmita 2019 - Sports Festival