Adithya Ramesh

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Website | Github | LinkedIn | Google Scholar

EDUCATION

- **MS Robotics, Northeastern University** Boston, USA, Sep 2023 - Present
  Concentration: Computer Science
- **Dual Degree (B.Tech, M.Tech) in Engineering Design, IIT Madras** Chennai, India, Aug 2011 - June 2016
  Stream: Automotive Engineering, Minor in Systems Engineering, CGPA: 8.3 / 10

PUBLICATIONS

- **"Physics-Informed Model-Based Reinforcement Learning"**, Adithya Ramesh and Balaraman Ravindran, published in Learning for Dynamics and Control Conference (L4DC), 2023 (Paper | Webpage | Code)

PROFESSIONAL EXPERIENCE

- **Research Associate, Robert Bosch Centre for Data Science and AI, IIT Madras** Chennai, India, Oct 2021 - Aug 2023
  Physics-Informed Model-Based Reinforcement Learning: We learn the dynamics model of a robot using a physics-informed neural network and use it to train a model-based RL algorithm. We show that, in model-based RL, model accuracy mainly matters in environments that are sensitive to initial conditions, where numerical errors accumulate fast.

- **R & D Engineer / Scientist Ⅱ, Honeywell** Bengaluru, India, June 2018 - Mar 2021
  Multi-Agent Cooperation using Reinforcement Learning: Trained multi-agent systems with complementary sensing modalities (depth and color) to cooperate and execute a task using RL. Adopted a centralized training and decentralized execution approach based on the MADDPG algorithm.

  Autonomous Navigation for Quadrotors using Reinforcement Learning: Worked on a RL based autonomous navigation system for quadrotors, that can navigate to a goal position in the shortest path, without colliding with obstacles. Used the DQN algorithm for training.

  LSTM based Speaker Recognition: Developed a LSTM based text-independent speaker recognition system. Trained on 2000 hours of audio from 6000 speakers. Achieved an accuracy of ~ 91.8% on a test dataset containing 1250 speakers.

- **Deep Learning Engineer, Predible Health** Bengaluru, India, Sep 2017 - May 2018
  Biomedical Image Processing: Experimented with CNNs for lung nodule classification, prostate MRI segmentation.

- **Founder, Stealth Robotics Startup** Chennai, India, June 2016 - Sep 2017

- **Intern, Airwood Aerostructures** Chennai, India, Dec 2014 - May 2015
  Flight Controller for Quadrotors: Worked on a flight controller for quadrotors. Developed complementary filter based state estimation algorithms and PID based control algorithms.

PROJECTS

- **Mixed State Entanglement in Quantized Chaotic Systems (Master's Thesis at IIT Madras)** (Link)
  Studied the connections between chaos and quantum entanglement. In particular, studied entanglement dynamics in mixed states of quantized chaotic systems, focusing on the quantum coupled standard map.

- **Pytorch implementation of popular Reinforcement Learning algorithms** (Link)
  Implemented popular RL algorithms such as DQN, A3C, DDPG, PPO, SAC from scratch in Pytorch. Tested the algorithms on tasks from OpenAI Gym and Deepmind Control Suite. Open sourced the code on Github.

TEACHING

- Teaching Assistant for RL course at Khoury College of Computer Sciences, Northeastern University in 2023 and 2024.
- Teaching Assistant for RL course at Department of Computer Science, IIT Madras in 2022 and 2023.

COURSEWORK

Deep Learning, Reinforcement Learning, Linear Algebra, Optimization, Robot Mechanics, Vehicle Dynamics, Control Theory

SKILLS

Operating Systems - Linux, Windows | **Programming Languages** - Python, C | **Development Tools** - SSH, Docker, Git
Deep Learning Frameworks - Pytorch | **Scientific Computing** - Numpy, Matlab | **Microcontrollers** - Arduino
Robotics Frameworks - ROS | **Robotics Simulation** - MuJoCo, OpenAI Gym, Deepmind Control Suite, AirSim

SCHOLASTIC ACHIEVEMENTS

All India Rank 2264 in IIT JEE 2011, All India Rank 642 in AIEEE 2011, NTSE Scholar, KVPY Scholar