

ARPIT GARG

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PUBLICATIONS

- [1] **Arpit Garg**, Yazied A. Hasan, Adam Yañez and Lydia Tapia, “[Defensive Escort Teams via Multi-Agent Deep Reinforcement Learning](#),” *IEEE Robotics and Automation Letters (RAL)*, under review, 2019
- [2] **Arpit Garg**, Hao-Tien Lewis Chiang, Satomi Sugaya, Aleksandra Faust and Lydia Tapia, “[Comparison of Deep Reinforcement Learning Policies to Formal Methods for Moving Obstacle Avoidance](#),” In *Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS)*, to appear, Macau, China, Nov 2019

PROJECTS

- Cooperative Escorts for Payload Escorting via Multi-Agent Deep RL, Tapia Lab** June - Sept 2019
- Developed a method to train multiple agents with partial observations and no explicit communication to coordinate and safely escort a payload through environments with interacting moving obstacles
 - Implemented a distributed training system using RLlib that scaled the training from 1 machine to 100 workers and 4 GPUs thus reducing the training time by 26x and enabling us to collect 100M samples in 24hrs
- Moving Obstacle Avoidance with Deep RL, Tapia Lab** Nov 2018 - March 2019
- Implemented and trained a deep RL actor-critic algorithm, A3C, to navigate a robot while avoiding obstacles with deterministic and stochastic motions
 - Used Distributed TensorFlow to implement and scale A3C thus increasing the training speed from 15steps/sec on a MacBook Pro to 1300steps/sec on 4 nodes with 16 CPU cores each
- Solving Board Games Using Deep RL, Personal Project** July - August 2018
- Implemented RL algorithms: Q-Learning (DQN), Policy Gradient, Actor-Critic and AlphaGo Zero and solved the games Connect-4 and Tic-Tac-Toe on multiple board sizes using TensorFlow
 - Performance of a policy was evaluated by pitting against a perfect playing minimax bot with 5% error. More than 90% wins was considered as convergence
 - The code is written in Python and can be found at <https://github.com/kirarpit/connect4>
- Custom Pseudo-C Compiler, UNM** Jan - April 2018
- Built a standalone program, written in C++, that compiles a legal LOBO-C (a custom C like language) file and generates MIPS assembly code
 - The code is written in C++ and can be found at <https://github.com/kirarpit/compiler-construction>
- Web Push Notifications, MySmartPrice** 2016
- Built and scaled a system that capture web-push notification subscriptions using JQuery, to be able to send notifications to over 650,000 daily active users and analyse their interactions with the website

EDUCATION

- University of New Mexico (UNM)** New Mexico, USA
Master of Science in Computer Science; GPA 4.1/4.0 Jan 2018 – Dec 2019 (Expected)
- Indian Institute of Technology, Roorkee** Roorkee, India
Bachelor of Technology (B.Tech) in Civil Engineering July 2010 – May 2014

WORK EXPERIENCE

- Research Assistant** July 2018 - Present
Tapia Lab, UNM Albuquerque, USA
- Studied and implemented state-of-the-art Deep RL algorithms to tackle problems in robotic motion planning and systems and human-AI collaboration
- Senior Product Engineer** June 2014 – July 2017
MySmartPrice Web Technologies Pvt. Ltd. Hyderabad, India
- Contributed to the company’s PHP code base architecture and development, website security, and system administration as a back-end developer
 - Designed and implemented business logic and data storage solutions at the back end

LEADERSHIP EXPERIENCE

- Founder: Coding Interview Club, UNM** July 2018
- Started a club to help students practice and get better at cracking the coding interviews
 - Organized weekly meetings in which students solved problems on whiteboard and ran mock interviews

SKILLS

- Related Skill Sets – Deep RL, Machine Learning, Software Development, Back-end Web Development, Linux
- Programming Languages and Software Packages – RLlib, TensorFlow, GNU Parallel, Python, C++, PHP