KARMESH YADAV

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EDUCATION

Carnegie Mellon University - School of Computer Science — Pittsburgh, PA
Master of Science in Robotic Systems Development (MRSD) | **GPA:** 3.95/4.33 — May 2020
Courses: Deep RL, PGM, Underactuated Rob., Robot Autonomy, Manipulation Estimation and Control

Indian Institute of Technology - Guwahati — Guwahati, India
Bachelor of Technology in Mechanical Engineering | **GPA:** 8.49/10 — Jun. 2017

RECENT EXPERIENCE

AI Resident, Facebook AI Research, Menlo Park — Sep. 21 - Present

- Researching self-supervised pretraining techniques for learning useful representations for embodied agents. Using representations on downstream RL tasks like ImageNav, etc. in the Habitat Sim.

Robotics Engineer, ISEE Inc, Boston — Jul. 20 - Aug. 21

- Explored deep uncertainty estimation techniques for predicting the closed loop tracking performance of an AV controller. Estimated the collision prob. of the AV w.r.t. obstacles in an occupancy grid.
- Improved the trajectory optimization planner and robustified its collision checking. This led to an increased confidence in its performance and resulted in its deployment on the AV.
- Developed the speed planning module for safely achieving three-fold increase in operating speed.

Intern, Autonomous Driving Team, Mathworks, Hyderabad — Aug. 17 - Nov. 17

- Optimized ORB-SLAM and made it more robust to fuse its position output with RTK-GPS, IMU & Wheel Encoder data using an EKF.
- Worked on SLAM pose covariance estimation and extrinsic calibration of IMU and cameras.

PUBLICATIONS

- Look-Ahead Meta Learning for Continual Learning [NeurIPS 2020 *Oral*]: Gunshi Gupta*, **Karmesh Yadav*** and Liam Paull [ArXiV][Code]
- Learning to Prevent Monocular SLAM Failure using Reinforcement Learning [ICVGIP 2018]: Vignesh Prasad*, **Karmesh Yadav***, Rohitashva Singh Saurabh, Swapnil Daga, Nahas Pareekutty, K. Madhava Krishna, Balaraman Ravindran, Brojeshwar Bhowmick. [ArXiV]

PROJECTS

Detection and Response for Potential Head-On Vehicle Crashes [Link] — Sep. 18 - Dec. 19
Prof. John Dolan, Robotics Institute, Carnegie Mellon University | Daimler Trucks North America

- Designed and developed the system architecture for Collision Avoidance Systems for Daimler Trucks.
- Implemented an EKF for Radar-Camera Sensor Fusion and Behavior Prediction of on-coming vehicles.

Constrained iLQR for Motion Planning in Autonomous Vehicles [Link] — Nov. 19 - Dec. 19
Prof. Matt Travers, Robotics Institute, Carnegie Mellon University

- Implemented the iterative-LQR algorithm for motion planning with dynamic obstacle avoidance.
- Developed a Python simulation stack to simulate aggressive and conservative driving behaviours.

Learning Human-like Driving Behaviour in CARLA — May. 19 - Sep. 19

- Developed environment wrappers for the CARLA Simulator to enable scalable RL research for AV.
- Implemented Behaviour Cloning and Reinforcement Learning baselines for route following task.
- Investigated adversarial learning techniques to interactively learn generalizable driving behaviour.

***Very Social Robot* - A socially intelligent agent for object handover** [Link] — Feb. 19 - May. 19
Prof. Oliver Kroemer, Robotics Institute, Carnegie Mellon University

- Developed a Gaussian Process-based reward learning module to improve human-robot object handover strategy based on human feedback.
- Created a PRM planner and a PID controller for operating a 6-DOF robotic arm.

SKILLS

Languages & Libraries: C++, C, Python, SQL, Pytorch, Keras, PCL, OMPL
Software Packages: ROS, MATLAB, Simulink, Habitat, Gazebo, V-Rep, CARLA, Solidworks
Hardware: P3-DX, LocoBot(Facebook), Pointgrey Cameras, Xsens IMU, ZED, Velodyne

ACTIVITIES

Member, Robotics Institute Summer Scholar Admissions Committee — Jan. 19 - Feb. 19
Team Captain, Formula Student Bharat 2017 — May 16 - Jan. 17