Parth Chopra

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EXPERIENCE

HONDA R&D AMERICAS, INC | Research Engineer - Perception & Localization Jun 2019 – Present | Ann Arbor, MI

- Wrote performant code for perception algorithms on Connected & Automated Vehicle prototypes. Worked on object detection, sensor-fusion, and Multi-Object Tracking with RGB cameras, LiDAR, and Radar using C++, Python, TensorFlow in Docker-ized ROS stack.
- Worked on algorithms for geometric computer vision, multi-sensor calibration, V2V networking and integration
- Scripted and performed data collection and testing of perception and motion-planning algorithms in autonomous driving prototypes.
- Collaborated with external university & industry partners, co-authored submissions for ICRA 2020 and IROS 2020

MAGNA INTERNATIONAL | Robotics Engineering Intern, Corporate R&D May 2018 – Aug 2018 | Troy, MI

- Developed software for industrial ABB manipulators in manufacturing using ROS, DDS, Point Cloud Library in Linux.
- Coordinated engineering team of 5+, performed Git maintenance, code documentation using JIRA, Confluence, Scrum, & Kanban.

INSTITUTO DE SISTEMAS E ROBÓTICA | Robotics Intern, SocRob@Home Team May 2017 – Jul 2017 | Lisbon, Portugal

- Developed a ROS - Gazebo-based multimodal simulation for IDMind MOnarCH Service Robot used in indoor social environments.
- Integrated packages used for perception, mobile navigation and manipulation for RoboCup@Home competition challenges.

BUBBLEFLY TECHNOLOGIES | R&D Engineer & Drone Pilot Jun 2016 – Feb 2017 | New Delhi, India

- Developed product, concept of operations, design requirements for ground-surveying intelligent multirotor UAV applications.

EDUCATION

UNIVERSITY OF MICHIGAN | Master of Science : Robotics Sep 2017 - May 2019 | Ann Arbor, MI

- Coursework : Mobile Robotics & SLAM, Self-Driving Cars, Artifical Intelligence Foundations, Computer Vision, Machine Learning Robot Systems Lab, Robot Kinematics & Dynamics, Math for Robotics, Motion Planning, Computational Data Science

DELHI TECH. UNIVERSITY [DTU] | BTech : Engineering Physics, Minor : Robotics Aug 2012 - Jun 2016 | New Delhi, India

PROJECTS

NASA Space Robotics Challenge Phase 2 May 2020 – present

- Ongoing work on Gazebo-based Mars rover simulation to denoise and perform semantic segmentation with stereo & 2D-LiDAR data.

GRADUATE COURSEWORK PROJECTS

Mobile Robotics & SLAM Methods Mar 2019 – April 2019

- Developed, evaluated and integrated a deep learning-based place recognition & matching module for augmenting loop closure in C++ based ORB-SLAM2 framework, using HOG-like image feature descriptors generated by convolutional autoencoders .

Self-Driving Cars: Perception & Control Sep 2018 – Dec 2018

- Implemented and trained custom ResNet & InceptionNet models in PyTorch on AWS EC2 instances to classify images, optimized performance for >99% validation accuracy on a photorealistic driving simulation dataset.
- Implemented ICP point cloud registration, visual odometry, stereo perception & EKF-SLAM algorithms using MATLAB.

Artificial Intelligence, Motion Planning Sep 2018 – Dec 2018

- Implemented Monte Carlo sampling methods for inference on Probabilistic Graphical Models using Java.
- Used Three.JS + JavaScript, Python + OpenRAVE to implement RRT-Connect, RRT* for motion planning on PR2 robot simulator.

LOCKHEED MARTIN-DTU - UNMANNED AIR SYSTEMS STUDENT TEAM

Avionics Lead, Flight Director, Test Pilot Oct 2012 – Jun 2015 | New Delhi, India

- Led multidisciplinary team of 20+ undergraduate students to achieve Third Place / 33 teams in AUVSI SUAS 2014; Sixth Place / 35 teams in AUVSI SUAS 2013. Participated in three full design-cycles for Group 1 & Group 2 Unmanned Aircraft Systems.
- Performed V-model based systems engineering for fixed-wing and multirotor UAV's, integrating open-source Pixhawk / Ardupilot-based autopilots, avionics, imagery, & multiple RF modules to perform Intelligence, Surveillance & Reconnaissance missions.
- Developed geometric target detection and shape recognition on aerial images using OpenCV on Raspberry Pi.

PUBLICATIONS

- A. Miller, K. Rim, **P. Chopra**, P. Kelkar, M. Likhachev, "Cooperative Perception and Localization for Cooperative Driving", IEEE International Conference on Robotics and Automation **[ICRA] 2020 (accepted)**
- P. Kelkar, **P. Chopra**, S. Pereira, D. DeLano, A. Miller, K. Rim, S. Rajab, J. Butzke, M. Likhachev, "Affordable Autonomy through Cooperative Sensing and Planning", IEEE International Conference on Intelligent Robots and Systems **[ICRA] 2021 (under review)**
- S. Gautam, **P. Chopra** et al, "Systems Engineering Approach for design of a mini UAS for Intelligence, Surveillance and Reconnaissance", Association for Unmanned Vehicle Systems International [AUVSI] Student Unmanned Aerial Systems [SUAS] Competition 2014