

Parv Kapoor

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Education

Carnegie Mellon University | School of Computer Science

DOCTOR OF PHILOSOPHY IN SOFTWARE ENGINEERING

CQPA: 4.08/4.00 Advisors: Eunsuk Kang and Sebastian Scherer

Pittsburgh, U.S.A.

Fall 2021 - Present

Manipal Institute of Technology

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE ENGINEERING

CGPA: 8.59/10 | Minor: Intelligent Systems

Manipal, India

Fall 2016 - Fall 2020

Selected Coursework: Human Robot Interaction, AI for Social Good, Formal Methods, Machine Learning, Artificial Intelligence, Natural Language Processing, Social Network Analysis, Probability Theory and Statistics.

Skills

Programming Python, C/C++, JAVA, OpenCL, MySQL, CUDA programming, PLSQL, Verilog, LaTeX

Tools ROS, OpenCV, Tensorflow, PyTorch, AirSim, CARLA, Pyglet, Tesseract, Matlab, ZED SDK, ADO.NET

Experience

Carnegie Mellon University

GRADUATE RESEARCH ASSISTANT | PI: EUNSUK KANG CO-PI: SEBASTIAN SCHERER

Pittsburgh, U.S.A.

Aug. 2021 - Ongoing

- Developing safe and robust planning methods for autonomous aircraft control. We are using a combination of STL specifications and control barrier functions to ensure reliable behavior. This work is done in collaboration with AirLab.
- Formulating abstraction inspired model-learning techniques for RL applications. This work is done in collaboration with Professor Ding Zhao's safe AI lab.

VERIMAG, Université Grenoble Alpes

RESEARCH ENGINEER | PI: THAO DANG

Grenoble, France (Remote)

Jan. 2021 - Aug. 2021

- Formalized the notions and concepts for uniform random stimulus generation based on timed automata. This work was done for quantitative validation of autonomous systems.
- Deployed them in simulation environment SUMO for autonomous vehicle applications.

CPS-VIDA Lab, University of Southern California

RESEARCH ASSISTANT | PI: JYOTIRMOY VINAY DESHMUKH

Los Angeles, U.S.A.

Jan. 2020 - Jan. 2021

- Implemented novel model based RL, model free RL and evolutionary strategies algorithms for optimising over Signal Temporal Logic defined safety constraints.
- Developed multiple in house environments to deploy methods alongside CARLA, AirSim and Gazebo simulators.
- A research paper based on our unprecedented optimisation for STL Quantitative Semantics is currently due for submission.

Visual Computing Researchers Lab, Cardiff University

RESEARCH INTERN | PI: DAVID MARSHALL

Cardiff, U.K.

May 2019 - July 2019

- Developed a bioinspired deep learning and computer vision virtual guidedog project for safe trajectory prediction. The project aimed at obstacle avoidance to aid partially blind people.
- The implementation predicts subject trajectory and suggests optimal user action. Visual odometry, Optical flow, Human Perception, scene translation and convolution neural nets were used to create a real time solution. The project was programmed using Tensorflow for python and ZED stereo camera API.
- An abstract on our research findings was accepted at Applied Vision Associations held in December 2019.

RapidQube Digital solutions Pvt. Ltd.

RESEARCH INTERN

Mumbai, India

May 2018 - July 2018

- Implemented an obstacle avoidance project utilizing Computer Vision knowledge and Deep Convolutional neural network with capability to log data onto a blockchain network. The project was constructed using Tensorflow for python and NEM SDK.
- The project alerts drivers in case of anticipated accidents using depth perception networks, object tracking algorithms(YOLO) and On-Board diagnostics device and logs driver information obtained using Optical Character Recognition(Tesseract) on Number plates, onto the NEM Blockchain network.

Publications and Preprints

Follow The Rules: Online Signal Temporal Logic Tree Search for Guided Imitation Learning in Stochastic Domains

J. PATRIKAR, J. ALOOR, **P. KAPOOR**, S. SCHERER AND J. OH

2022

- submitted to ICRA 2023

Challenges in Close-Proximity Safe and Seamless Operation of Manned and Unmanned Aircraft in Shared Airspace

J. PATRIKAR, J. DANTAS, S. GHOSH, **P. KAPOOR** ET AL

2022

- In ICRA 2022 Workshop on Intelligent Aerial Robotics: From Autonomous Micro Aerial Vehicles to Sustainable Urban Air Mobility and Operations

Model-based Reinforcement Learning from Signal Temporal Logic Specifications

P. KAPOOR, A. BALAKRISHNAN, J. V. DESHMUKH

2020

- Under submission

Predicting Time to Contact Across the Visual Image

D. MARSHALL, S.K. RUSHTON, J. REDFERN, **P. KAPOOR**, R.J. MORAN

2020

- In PERCEPTION (Vol. 49, No. 6, pp. 714-714) SAGE PUBLICATIONS LTD.

Achievements & Volunteer work

- 2022 Selected for 11th Summer school on Formal Techniques organized by SRI International
- 2020 Member of the Organising committee for the 20th International Conference on Runtime Verification held in Los Angeles.
- 2020 Remotely mentored UW-Madison students on applications of deep reinforcement learning for stock trading and analysis.
- 2019 1 out of 4 students selected out of 600 students for an all expense paid 3 weeks Training program in Huawei Enterprises China premises.
- 2019 Won an internship offer in Cardiff university after competing with multiple candidates from 83 local committees worldwide
- 2019 Presented a Poster at Bristol Vision Colloquium at University of Exeter.