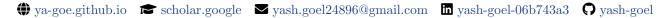
Yash Goel



EDUCATION

University of Bonn

Oct. 2019 - Feb. 2022

Bonn, Germany

 $M.Sc.\ Geodetic\ Engineering\ (Mobile\ Sensing\ &\ Robotics),\ 1.1,\ Distinction$

Jul. 2014 – Apr. 2018

Indian Institute of Technology Roorkee

n. 2014 1tpr. 2016

B. Tech. Mechanical Engineering

Roorkee, India

PUBLICATIONS

• Y. Goel*, N. Vaskevicius, L. Palmieri, N. Chebrolu, K. A. Orras, C. Stachniss, "Semantically Informed MPC for Context-Aware Robot Exploration" at *IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems* (IROS 2023).

[Paper] [WS Paper]

• P. S. N. Jyotish*, Y. Goel*, A. V. S. S. B. Kumar, K. M. Krishna, "PIVO: Probabilistic Inverse Velocity Obstacle for Navigation under Uncertainty" at 28th IEEE Intl. Conf. on Robot & Human Interactive Communication (ROMAN 2019). [Paper]

• P. S. N. Jyotish*, Y. Goel*, A. V. S. S. B. Kumar, K. M. Krishna, "IVO: Inverse Velocity Obstacles for Real Time Navigation" at Proceedings of the Advances in Robotics 2019 (AIR 2019). [Paper]

EXPERIENCE

SafeAD GmbH Apr 2022 – Present

CV & ML Engineer

Karlsruhe, DE

- Developed a transformer-based model for detection and tracking of dynamic objects, traffic signs, and traffic lights, as well as semantic map segmentation on a custom dataset. Evaluated multi-task learning techniques, including GradNorm and uncertainty weighting.
- Created an online approach for vector-based HD map prediction across cities with varying and dense road markings.
- Contributed to model deployment by exporting the online model to TensorRT and implementing Python bindings for different perception pipeline modules.

Robert Bosch Corporate Research

May 2021 - Feb 2022

Master Thesis Student

Renningen, DE

- Implemented a novel technique of costmap prediction for object goal navigation in indoor environment using semantics.
- Integrated MPC based continuous control along with mid-level visual priors which led to a 7% increase in success. Work published in IEEE IROS 2023.

Stachniss Lab, University of Bonn

Mar 2020 - Mar 2021

Graduate Student Assistant, HiWi

Bonn, DE

- Implemented mapping techniques from scratch, including TSDF and Poisson Surface Reconstruction.
- Developed an incremental mapping pipeline by extending Poisson Surface Reconstruction with Dirichlet boundary conditions in the Laplace solution.

Robotics Research Centre, IIIT Hyderabad

 $Jun\ 2018-Jun\ 2019$

Research Assistant

Hyderabad, IN

- Developed dynamic obstacle avoidance for Parrot Bebop using collision cone-based optimization for evasive maneuvers.
- Applied probabilistic methods to enhance dynamic obstacle avoidance with control and object pose uncertainty.
- Built a deep network to learn non-linear MPC control for trajectory tracking within ROS.

PROJECTS

Social Robot Navigation in Real Life [Video][Report]

Oct 2020 - Mar 2021

- Worked on comparing human motion prediction techniques SocialGAN and maximum entropy method in ROS.
- Implemented MPC for navigation of KUKA youbot in real-life dynamic human environment.

Bag of Visual Words Aug 2020

• Implemented bag of visual words (BoVW) algorithm for image matching in C++.

Autonomous Control of Quadcopter Using Deep RL [Video][Paper]

Oct 2017 – Apr 2018

- Worked on autonomous navigation of quadcopter in AirSIM using depth image as input exploring rewards.
- The control policy was learned using DQN and the work was published in IEEE AUTEEE '19.

IIT Roorkee Motorsports

 $Jul \ 2015 - Apr \ 2018$

- Led the Powertrain Division of the Formula SAE team, developing a formula-style electric race car.
- Responsible for design, FEA analysis, CAD packaging and manufacturing of drivetrain parts of 2017 car, Saber.
- Worked on designing vehicle dynamics models and controller design including yaw rate controller and torque vectoring.

TECHNICAL SKILLS

Languages: Python, C++, CUDA, MATLAB, LATEX

Packages: ROS, OpenCV, PyTorch, Open3D, TensorRT, ONNX

ACHIEVEMENTS & OTHERS

Selected for the CIFAR Deep Learning + Reinforcement Learning (DLRL) Summer School 2020 Secured an **All-India-Rank of 1693** in JEE Advanced 2014 amongst 150,000 candidates

Secured Rank of 21 in Science Open Merit Test 2012

Reviewer: IROS 2023, IROS 2024