

YASH TURKAR

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EDUCATION

University at Buffalo (State University of New York)

Doctor of Philosophy (Computer Science)

2021 - Present

Fr. Conceicao Rodrigues College of Engineering (Aff. University of Mumbai)

Bachelor of Engineering (Computer Engineering)

2016 - 2020

SKILLS

Technical Skills: Python (OpenCV, Open3D, Numpy, Pandas, Pytorch), C, C++, HTML, CSS, Linux, Bash, Shell, LXC, Docker, ROS, SLAM, Gazebo, Point-cloud processing, Sensor Fusion, State Estimation, LiDAR, PCL, Git, MATLAB, CAD, LaTeX, Networking, Virtualization, Microsoft Office

Soft Skills: Critical Thinking, Deducting Reasoning, Problem-Solving, Teamwork, Collaboration, Analytical Skills, Presentation Skills

EXPERIENCE

University at Buffalo (State University of New York)

Graduate Teaching Assistant (CSE 468/568 Robotics Algorithms)

2022 - Present

- Evaluated programming assignments and examinations
- Explained critical concepts and programming logic to students
- Designed ROS based programming assignments in areas of Robot Perception, Planning and Estimation

Schlumberger (SLB)

Digital Intern – Autonomous Robotics Operations (ARO)

Summer 2022

- Developed and deployed robotics solutions for autonomous inspection at mid-stream new-product development

InfiCorridor Solutions Pvt. Ltd.

Researcher and Solutions Architect

2020 - 2021

- Developed Unmanned Aerial Systems based surveying solutions for geo-spatial applications
- Designed POC implementation of custom mapping system for UAV platform
- Planned and executed geo-spatial projects for large scale land surveying

Centre of Studies in Resources Engineering, IIT, Bombay

Research Intern - Satellite Image processing lab

2018 - 2019

- Conceptualized and implemented deep-neural-network to detect trees from UAV imagery
- Implemented algorithm for Invisible Watermarking of satellite images based on Curvelets using open-source tools

PROJECTS

DRONES Lab – University at Buffalo

PQM – Point-Cloud Quality Metric for LiDAR Based SLAM

2022 – Present

Description – Exploring performance and feasibility of LiDAR based SLAM methods for high-fidelity 3D reconstruction. Most LiDAR based SLAM systems focus only on the Absolution Trajectory Error (ATE) of the odometry estimated. The primary objective of this research is to evaluate the quality of the map generated by such systems using a purpose build map quality metric (PQM) that evaluates point-clouds against ground truth based on completeness, artifacts, accuracy, and resolution. Applications include evaluation of mapping for infrastructure inspection, 3D reconstruction and semantic analysis.

Status: Completed

MPSH Technology Center – Schlumberger (SLB)

Autonomous Inspection using Mobile Robots

Summer 2022

Description – Robotics for Oil and Gas industry is a new and emerging area. Inspection and monitoring of facilities is a dangerous and repetitive task which is very suitable for new-generation autonomous robots.

The project focused on evaluating the feasibility of using quadruped and other mobile robots to autonomously inspect facilities and plants using an array of advanced sensors such as LiDARs, thermal cameras, microphones, event-based cameras and 360 ° cameras. This required tight integration of various sensors and programming of robotic solutions. Additionally, the project aimed to evaluate current LiDAR based

simultaneous localization and mapping (SLAM) methods for high-fidelity 3D mapping. Several popular LiDAR based SLAM methods were explored and tested in real as well as simulated environments, the results were assessed and processed to generate realistic 3D models. As a result, a proof-of-concept system was developed and deployed at a mid-stream on-shore facility. The 170k sq. ft. facility was mapped using state-of-the-art LiDAR mapping methods as well as photogrammetry by aerial imagery (images were captured using autonomous UAVs). The system was rigorously tested, and high-resolution maps with centimeter precision were generated.

Status: Completed

DRONES Lab – University at Buffalo

F1Tenth – 1/10th Scale Autonomous Racing

2022 – Present

Description - F1TENTH Autonomous Racing is a semi-regular competition organized by an international community of researchers, engineers, and autonomous systems enthusiasts. F1tenth serves as a platform for research in robot perception, high-speed planning, and control. Current research is focused on lightweight odometry and localization and high-performance planning methods.

Status: In Progress

Awards: Graduate Leadership Award 2022 by Dept. of Computer Science and Engineering, University at Buffalo

DRONES Lab – University at Buffalo

Multi-Modal Gait and Anthropometric Data Collection (Indoor Section)

2021 – 2022

Description - This study focuses on face and gait data collection from various angles with multiple views and motion capture data for person identification. The dataset generated by this study is aimed towards gait and face recognition research from unusual camera angles.

Status: Completed

University at Buffalo

Generative-Network based multimedia super-resolution for UAV remote sensing

2021 – 2022

Description - Unmanned Aerial Vehicle (UAV) based aerial mapping has taken over the surveying industry thanks to low costs and ease of use. Although these UAVs have relatively high-resolution imaging systems, there exists a near exponential relationship between the ground sampling distance and the number of images required - which is a function of flight altitude. To tackle this, we propose a generative network based super-resolution approach to increase the GSD of images which effectively reduces flight time.

Status: Completed (Paper published at IGARSS 22')

Fr. Conceicao Rodrigues College of Engineering – University of Mumbai

"Hex-Wife", a hex-rotor UAV system developed for AUVSI SUAS 2019

2018 – 2019

Description: Autonomous Multi-rotor platform with object recognition and payload delivery capabilities developed for the Association of Unmanned Vehicle Systems International (AUVSI) Student Unmanned Aerial Systems (SUAS) Competition

Status: Completed

Awards: "Just Joe Sportsmanship Award 2019"

PUBLICATIONS AND PAPERS

Y. Turkar, C. Aluckal, S. De, V. Turkar and Y. Agarwadkar, "*Generative-Network Based Multimedia Super-Resolution for Uav Remote Sensing*," IGARSS 2022 - 2022 IEEE International Geoscience and Remote Sensing Symposium, 2022, pp. 527-530, doi: 10.1109/IGARSS46834.2022.9884486.

Y. Turkar, C. Aluckal, Y. Dighe, S. Deshpande, and Y. Agarwadkar, "*Conceptualization of Uav Based Waypoint Generation for Precision Horticulture*," 2020 IEEE India Geoscience and Remote Sensing Symposium (InGARSS), 2020, pp. 150-153, doi: 10.1109/InGARSS48198.2020.9358973.

C. Aluckal, **Y. Turkar** et al., "*Dynamic real-time indoor environment mapping for Unmanned Autonomous Vehicle navigation*," 2019 International Conference on Advances in Computing, Communication and Control (ICAC3), 2019, pp. 1-6, doi: 10.1109/ICAC347590.2019.9036813.

H. Tulapurkar, V. Turkar, B. K. Mohan and **Y. Turkar**, "*Curvelet Based Watermarking Of Multispectral Images And Its Effect On Classification Accuracy*," 2019 URSI Asia-Pacific Radio Science Conference (AP-RASC), 2019, pp. 1-7, doi: 10.23919/URSIAP-RASC.2019.8738393.

Y. Dighe, **Y. Turkar** et al., "*Dynamic path planning system for UAV remote sensing in urban environments*," National Symposium on Innovations in Geospatial Technology for sustainable Development with special emphasis on NER, ISG, ISRS, 2019

REFERENCES

Dr. Karthik Dantu

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