Pareese Pathak

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Education

Georgia Institute of Technology **Aug. 2023 – Dec. 2024**
Master of Science in Civil Engineering (Construction and Infrastructure Systems Engineering) *GA, USA*

Visvesvaraya National Institute of Technology *(VNIT)* **Aug. 2019 – May 2023**
Bachelor of Technology in Civil Engineering; Cumulative Grade Point Average: 8.6/10.0 *Nagpur, India*

Technical Skills

- **Programming Languages/Libraries:** Python, OpenCV, Sklearn, Pytorch, Tensorflow, MATLAB, C/C++, C sharp.
- **OS/Development boards:** Linux, Windows, ROS (Robot Operating System), NVIDIA Jetson, Microsoft HoloLens2.
- **Software Packages/Frameworks:** MS Office, Meshlab, Visual Studio, AutoCAD, Unity.
- **Development tools:** GitHub, Anaconda, Atom, MRTK.

Research and Experience

Network Dynamics Lab **Oct. 2023 – Present**
Graduate Student Assistant - Advisor Dr. John Taylor *Georgia Tech, USA*

- Developing AR/MR/VR applications for VDC(Virtual Design and Construction) and Robotics.
- Creating a streamlined pipeline to enable real-time interaction by visualizing point clouds on Microsoft HoloLens 2.

AssetIntel **Apr. 2022 – Jul. 2022**
Summer Internship: DetectX Development *New Jersey, USA*

- Programmed software that provides asset management solutions for the infrastructure and transportation industry.
- Modeled transfer learning pipeline to identify the bridge's structural elements and classify the defects using ResNet-50, Xception model, and VGG-19 architectures with training and testing accuracy of 96% & 75% respectively.

ATMAS - Autonomous Traffic Monitoring and Analysis System **Feb. 2021 – Nov. 2021**
Undergraduate Research - Advisor: Prof. Udit Jain *Nagpur, India*

- Coded a Python program to autonomously estimate the vehicle motion (trajectory, acceleration, and velocity profiles) from real-time video streams using a Yolov4 object detector, optical flow tracking, and computer vision.
- Successfully deployed the algorithm on NVIDIA Jetson Nano and IMX cameras to monitor the local traffic and generate reports of traffic congestion and rash driving. The product was filed for a patent (Number-202221057506)

Projects

Gaze Detection for Driver Behaviour Analysis **Sep. 2022 – May. 2023**
Bachelor's Thesis Project: Department of Civil Engineering, VNIT *Nagpur, India*

- Developed an IoT-based pupil-tracking device that identifies the region observed by the driver and pupil motion.
- Implemented road sign & lane detection, and pupil projection to generate a heat map and reports.

Unsupervised Registration of 3D Point Cloud **Feb. 2022 – Aug. 2022**
Guided by: Prof. Dr. Chen Feng - AI4CE Lab *New York University, USA*

- Created Deepmapping plus pipeline to generate 3D maps of LiDAR scans using an Unsupervised Neural network.
- Improved a global point cloud registration algorithm to handle large orientation changes like rotation and translation.

Visual Odometry Using Monocular Camera **Jul. 2020 – Feb. 2021**
IvLabs, VNIT *Nagpur, India*

- Estimated the motion of a calibrated monocular camera mounted over a mobile platform by estimating camera pose.
- Optimized feature detection, matching, and tracking methods for 2D-2D and 3D-2D projections on KITTI Dataset.

Achievements and Publications

- **Patent:(ATMAS)** - An autonomous traffic monitoring and analysis system. Number-202221057506
- **Finalists at the Smart India Hackathon 2022** - Designed software to monitor road condition using drones and AI.
- **Third Place In CREPIDO AXIS** - Designed Optimised Truss Bridge Design in AutoCAD.
- **Fourth Place In IPAS Challenge** - Designed an Autonomous Drone for the Martian Environment.
- **Publication** - The influence of obliquity on the pull-out capacity of two-dimensional plate anchors embedded in the homogeneous sand bed. R D Shambharkar, P S Pathak, G Santhoshkumar, V Srinivasan (Under Review)

Relevant Coursework

Transportation Engineering	Coursera - Control of Mobile Robots	Stanford University - CS231n, Spring 2017
Remote sensing and GIS	Udacity - Introduction to Computer Vision	University of Bonn - Photogrammetry I & II