Simran Chauhan

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Education

Worcester Polytechnic Institute, Worcester, United States — Aug 2024 – Aug 2026
MS in Robotics Engineering, GPA 4.0/4.0
Coursework: Computer Vision, Machine Learning, Robot Control, Robot Manipulation

Visvesvaraya National Institute of Technology, Nagpur, India — Jul 2017 – Jun 2021
BTech in Electrical Engineering, GPA 8.59/10
Coursework: Numerical Methods, Probability Theory, Linear Algebra, Calculus

Technical Skills

Languages Python, C++
Tools: ROS/ROS2, OpenCV, MATLAB, PyTorch, Git, Linux, CARLA, Gazebo, RViz, Google Cartographer, Kalman Filtering, SLAM, Deep learning algorithms, LQR & MPC Controller, Power BI, SolidWorks, Eagle, NI Multisim

Projects

3D Reconstruction using Structure from Motion — Feb 2025- Mar 2025
WPI, United States
- Engineered a SfM pipeline integrating triangulation with RANSAC, minimizing reprojection errors by 89% and achieving 0.87-pixel reconstruction accuracy across views
- Developed multi-view camera system with PnP algorithms and sparse bundle adjustment, improving pose estimation by 57% while optimizing 1,200+ 3D points simultaneously

Robust Camera Calibration using Zhang's Method — Feb 2025- Mar 2025
WPI, United States
- Implemented Zhang's camera calibration method with Levenberg-Marquardt optimization, reducing geometric reprojection error by 76% (from 2.15 to 0.511 pixels)
- Refined camera calibration by optimizing radial distortion coefficients from k=[0,0] to k opt=[0.168,-0.721] using the Levenberg-Marquardt algorithm

Panorama Image Stitching Using Computer Vision and Supervised Deep Learning — Jan 2025- Feb 2025
WPI, United States
- Created a panorama stitching algorithm using Harris corner detection with ANMS and RANSAC-based homography estimation, implementing distance-weighted blending for seamless image transitions
- Developed dual deep learning homography approaches: supervised VGG-16 achieving 3px EPE and unsupervised model with photometric loss, both outperforming traditional methods

Boundary detection using PB-lite — Dec 2024- Jan 2025
WPI, United States
- Implemented PB-lite boundary detection integrating texture, brightness, and color gradient maps with Chi² distance computation, outperforming Sobel and Canny baselines
- Integrated multi-scale filter banks using DoG, Leung-Malik, and Gabor filters, which refined texture analysis and boosted edge feature extraction

Implementation of Deep Learning Architectures for Image Classification — Dec 2024- Jan 2025
WPI, United States
- Devised three distinct CNN architectures, ResNet-14, ResNeXt-14, and DenseNet, achieving 84% accuracy in image classification on a randomized CIFAR-10 dataset
- Enhanced model performance by 12% through batch normalization, data augmentation, and adaptive learning rate strategies.

Implementation of LQR and PD Controllers for 3D Quadrotor Trajectory Tracking — Oct 2024 – Dec 2024
WPI, United States
- Designed an optimal LQR controller for a 6-DOF quadrotor using hover state linearization, reducing non-linear trajectory tracking error by 82% while maintaining stability
- Developed a PD control system for a quadrotor that maintained 5cm positioning accuracy during both random hovering states and complex trajectory tracking

Implementation of Kinematics and Motion Planning for OpenManipulatorX Using ROS 2 — Nov 2024– Dec 2024
WPI, United States
- Programmed forward and inverse kinematics algorithms within ROS2 for the OpenManipulatorX, achieving an end-effector positioning accuracy of less than 7 mm

- Constructed PID and velocity controllers with ROS2 nodes for robotic arm's end effector, enabling seamless motion control for object manipulation tasks

Localization of Autonomous Vehicle in a GPS-Denied Environment Aug 2020 – Jul 2021
VNIT Nagpur, India
- Validated ORB-SLAM and RTAB-SLAM's performance for AV localization within the CARLA simulator, focusing on trajectory, localization, and maximum deviation errors compared to ground truth data
- Pioneered an optimized ICP-based mapping solution for LIDAR real-time data processing using ROS, reducing computational time by 30%

Sensor Fusion Algorithm Jul 2019 – Dec 2019
IVLABS, VNIT Nagpur, India
- Built Kalman filter algorithm that reduced sensor noise by 87%, enabling high-fidelity environmental mapping for autonomous navigation
- Integrated multi-sensor fusion system combining SharpIR and Ultrasonic sensors, boosting mapping accuracy by 63% in complex environments

Publications

- **IoT-Based Ambiance Monitoring System**
  International Conference on Advances in Mechanical Engineering (ICAME), 2020
  Hritwik Singh Parihar, Rajesh Nagula, Mayank Bumb, Danish Gada, Sharan Bajjuri, Rishesh Agarwal, and Simran Chauhan
- **Hand Gesture Control of Computer Features**
  International Conference on Advances in Mechanical Engineering (ICAME), 2020
  Rishabh Runwal, Shivraj Dhonde, Jatin Pardhi, Suraj Kumar, Aadesh Varude, Mayuresh Sarode, Mayuresh Bhoyar, Simran Chauhan, and Neha Marne

Work Experience

Senior Technical Executive: Technical Nov 2023 – Jul 2024
Synergy Denmark A/S, Mumbai, India
- Led data integration for an innovative AI solution(SYIA), facilitating cross-team collaboration while serving as key liaison between end-users and the development team
- Maintained strategic alignment between stakeholders and developers, ensuring continuous engagement to gather feedback, address challenges, and tailor AI tool solutions to business needs
- Assisted Technical, Business Performance and Project teams with data queries and analysis, ad-hoc tasks, and on-board technical issues

Technical Trainee: Electrical & Automation Nov 2021 – Oct 2023
Synergy Denmark A/S, Mumbai, India
- Collaborated with electrical superintendent to resolve malfunctions and provide insights, reducing maintenance by 10%
- Forged a Power BI system tracking 100% of EE allocation, ensuring balanced workloads and preventing project delays
- Enhanced team workflow efficiency by 15% through implementation of Power Automate/Power BI performance tracking system

Technical Trainee Jul 2021 - Nov 2021
Maersk Tankers Pvt Ltd
- Acquired in-depth knowledge of vessel electrical systems through 400+ hours of training from electrical superintendents
- Gained proficiency in tracing wiring diagrams and completed soft skills training in project management and communication

Extra Curricular

• *WPI, Worcester, United States*	Graduate Student Ambassador	Feb 2025 – Present
• *VNIT Nagpur, India*	Member, IVLabs (Robotics Club of VNIT)	Jun 2018 – Present
• *Synergy DK A/S, India*	Member, CSR (Corporate Social Responsibility Initiative)	Jul 2024 – Aug 2024
• *VNIT Nagpur, India*	Vice Chairman, IEEE VNIT Student Branch	Jul 2019 – Jul 2020

Achievements

- Scored the highest marks in Engineering Mathematics across all branches in First Year, VNIT Nagpur