

Shubham Singhal

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SUMMARY

Robotics Engineer specializing in perception systems and sensor integration for autonomous robots. Expert in C++ optimization for edge devices (Jetson, RealSense, LiDAR), with proven results—20% performance gains, 100% accuracy improvements over vendor solutions, deployed to hundreds of production robots.

TECHNICAL SKILLS

Languages: Modern C++, Python, C#, SQL

Robotics & Sensing: livox_lidar_api, librealsense2, Point Cloud Processing, LiDAR-Camera Calibration, ROS/ROS2, Gazebo

Computer Vision & ML: OpenCV, PyTorch, TensorRT, YOLOv8, Image Segmentation, Spatial Feature Extraction

Tools & Infrastructure: Linux (Ubuntu), Docker, Git, NATS Messaging, SolidWorks, Arduino, PCL (Point Cloud Library)

EXPERIENCE

Ugo, inc

Robotics Engineer

Tokyo, Japan

Oct 2024 – Present

- Refactored the entire Intel RealSense D435 control pipeline in C++, reducing CPU/memory usage by 20% and resolving critical deadlock conditions in IR emitter state management and terminal I/O operations.
- Migrated depth-to-point-cloud conversion from pixel color parsing to hardware-accelerated RealSense functions, improving point cloud density, accuracy, and latency.
- Developed marker-free meter reading system using template matching and spatial arrangement algorithms, achieving 100% accuracy improvement over third-party AI solution and removing customer QR placement requirements.
- Designed custom Livox 3D LiDAR noise filtering using geometry-based ROI calculations, successfully removing body-reflection artifacts and enabling deployment on space-constrained robot platforms.
- Collaborated with global Customer Success and Software teams to debug production hardware issues across hundreds of deployed robots, managing complex Git workflows for frequent release cycles.

Ugo, inc

Robotics Engineering Intern (Competitive Program)

Tokyo, Japan & Remote

May 2023 – July 2023

- Selected as 1 of 6 interns from premier IITs; advanced to on-site Tokyo cohort (top 3) based on exceptional remote performance, leading to Pre-Placement Offer.
- Optimized YOLOv5/v8 models for Jetson Nano edge deployment using TensorRT conversion, achieving 3X inference speedup for elevator button detection.
- Deployed autonomous navigation stack on Jetson Nano and Khadas Vim3 in 28 days during intensive on-site period, utilizing HectorSLAM and MCL, increasing operational efficiency by 20%.
- Built .NET C# server with NATS messaging for real-time navigation data distribution, supporting multi-robot coordination; developed URDF models and custom ROS nodes for sensor fusion.

SELECTED PROJECTS

Automated Wall Alignment Ratio (WAR) System for Construction

ML Engineer & System Architect

Contract Project

June 2024 – Sept 2024

- Built production ML pipeline for construction company to automate wall detection and alignment calculations from floor plan PDFs/images, successfully deployed to replace manual CAD analysis workflow.
- Applied transfer learning approach: trained foundation model on public datasets, then fine-tuned on client-specific floor plan styles; achieved validation loss below 0.19 with high accuracy on production data.
- Designed adaptive fine-tuning system allowing on-the-fly model retraining from user corrections, enabling continuous accuracy improvement through weighted feedback integration.
- Optimized training with patch-based processing to preserve detail without downsampling; applied advanced augmentation (ElasticTransform, CoarseDropout) to improve model robustness.

EDUCATION

Indian Institute of Technology (ISM), Dhanbad

B.Tech in Mechanical Engineering

Dhanbad, India

Dec 2020 – May 2024

ACHIEVEMENTS & LEADERSHIP

Amazon ML Summer School (2022): Selected for intensive program covering Deep Learning, Sequential Models, and industry ML applications.

HackerRank Gold Badge in Problem Solving; competitive programming experience with algorithmic optimization.

Technical Mentor, BeingArtifex IIT(ISM): Mentored 1000+ students in Python, C++, Arduino, and IoT development.