

Ayush Goel

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EDUCATION

- University of Pennsylvania** Philadelphia, PA
Master of Science in Robotics Engineering | GPA: 3.9 May 2024
Relevant Coursework: Deep Learning, Machine Learning, Machine Perception, Advanced Robotics, Learning in Robotics
- Thapar Institute of Engineering and Technology** Punjab, India
Bachelor of Engineering - Mechatronics Engineering | GPA: 3.89 June 2018
Relevant Coursework: Advanced Control Systems, Robotics Engineering, Kinematics & Dynamics of Machine, Signals & System
Awards: Certificate of Merit for 3 consecutive years | Achievements: 3RD rank in Undergrad, Merit-based Scholarships for all 4 years

SKILLS SUMMARY

- Programming:** C++, Python, JAVA, Shell Scripting, JavaScript, SQL, MATLAB, HTML5, CSS, XML, NodeJS
- Tools:** Git/GitHub, Docker, Latex, IntelliJ, Jenkins, Android Studio, MySQL, Maven, MongoDB, Postman
- Operating Systems:** Linux, macOS, Windows
- AI/ML/Robotics:** PyTorch, scikit-learn, pandas, TensorFlow, ROS, OpenCV, Gazebo, Sensor Fusion, CARLA, pytest
- Technologies:** AWS, Spring Boot, REST APIs, Microservices, Apache Tomcat, Elasticsearch
- Others:** Data Structures, Algorithms

RESEARCH EXPERIENCE

- Programme in Autonomous Robotics, IIT Delhi** Delhi, India
Research Intern Jan. 2017 - July. 2017
 - Designed and developed **Semi-Autonomous Mobile Robot** from **scratch** capable of moving autonomously in a pre-defined path or being operated remotely.
 - Incorporated **live video surveillance, obstacle avoidance & face recognition** to **enhance security**.
 - Worked on **CAD design, stress analysis, component selection, Odometry, PID control, PCB Designing, GUI development and programming of all components** of the robot.
 - Tech Stack:** Python, OpenCV, MATLAB, ROS, Pattern Recognition, Solidworks, Proteus

WORK EXPERIENCE

- Unicommerce eSolutions Pvt. Ltd.** Gurugram, India
Senior Software Development Engineer (Team Lead) Aug. 2019 - Aug. 2022
 - Responsible and decision-maker of **critical deliverables for high & low-level design changes** and ensuring **robust end-to-end architecture** of the platform.
 - Served as **Team Lead and mentored & managed team of Software Engineers** & ensured shipping of **high-quality products; fulfilling 80% more business requirements per sprint**.
 - Reduced cost of infrastructure by 25%** by redesigning integrations for **optimal bandwidth utilization** and implementing **load distribution, IP-rotation, and fallback**.
 - Led integration of International marketplaces; establishing **company's presence** in 7 middle-eastern regions.
 - Regular discussions with **Engineering and Business leaders** for **product and engineering roadmap**.
 - Awards:** Above and Beyond Call of Duty (ABCD) Award
 - Tech stack:** Spring Boot, Java, Mongo, SQL, Zookeeper, ActiveMQ, Elastic Search, AWS, CI/CD pipelines(Jenkins)

PERCEPTION AND DEEP LEARNING PROJECTS

- Dynamic Obstacle avoidance for Self-Driving Car** | DeepLearning, LSTM, PINN
 - Implemented **Social LSTM, OLSTM and GRU** for predicting pedestrians' trajectory.
 - Used **Physics informed Neural Nets** to model the nonlinear dynamics of **MPC** for planning car's motion.
- Bird's Eye View using Egocentric RGB images** | ImageSegmentation, LaneDetection, YOLOP
 - Performed **Instance Segmentation** for detecting vehicles & **YoloP** for Drivable Area Identification.
 - Used **Inverse Perspective Transformation** to reproject detected objects & lanes on Bird's-eye view plane.
- 3D Scene Reconstruction Pipeline** | SfM, OpticalFlow
 - Implemented **2-view and multi-view stereo** algorithms to convert multiple 2D views into 3D reconstruction
 - Using **Optical Flow** to find Point correspondences and estimate Depth.
- Perception Pipeline for Semi-Autonomous Mobile Robot (RoboMuse3XT)**
 - Developed & installed **4 DoF Robotic Arm** with payload capacity of **300gm** on RoboMuse3XT.
 - Implemented the **ROS Navigation Stack** to map the surrounding environment.
 - Performed **Pattern Recognition** to identify different **medical equipments**.

LEADERSHIP EXPERIENCE

- Unicommerce eSolutions Pvt. Ltd.** Gurugram, India
Team Lead Dec 2021 - July 2022
 - Reviewed the works of my team members, set up best software engineering practices and held tech sessions with team members for each assigned tasks. Also, mentored the members of the team for the various tasks.

SELF-LEARNED COURSES

Autonomous Mobile Robots, Robotics Specialization, ROS for Beginners: Basics, Motion and OpenCV, ROS for Beginners II: Localization, Navigation and SLAM, Machine Learning, Machine Learning A-Z™, Image Processing and Deep Learning