

# Ayush Goel

Website: [ayushgoel24.github.io](https://ayushgoel24.github.io)

Github: [github.com/ayushgoel24](https://github.com/ayushgoel24)

Email: [aygoel@seas.upenn.edu](mailto:aygoel@seas.upenn.edu)

Mobile: +1 (267) 231-6755

LinkedIn: [linkedin.com/ayushsgoel](https://linkedin.com/ayushsgoel)

## EDUCATION

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

## 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. [\[Report\]](#)/[\[Video\]](#)
  - 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

## COMPUTER VISION AND MACHINE LEARNING PROJECTS

- **Dynamic Obstacle avoidance for Self-Driving Car** [\[Github\]](#)
  - Implementing **LSTM** and **conformal prediction** for pedestrians' and cars' dynamic **trajectory prediction**.
  - Using the prediction, planning the car's **optimal path** using **MPC**.
- **TopDown with Transformation using Egocentric RGB images** [\[Github\]](#)
  - Implementing the **Birds-Eye view** of a car and its surroundings for park assist.
  - Using homographic projections of egocentric RGB images of surroundings and stitching them to get final image.
- **Perception Pipeline for Semi-Autonomous Mobile Robot (RoboMuse3XT)** [\[Video\]](#)
  - 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**.
- **Augmented Reality implementation using Tracking and Pose Estimation** [\[Github\]](#)
  - Used **Tracking** and **Pose Estimation** to place several virtual object models in real world by estimating camera poses using **Perspective-N-Point**; and **Persepective-three-point & Procrustes problem**.

## 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 redesigning integrations for **optimal bandwidth utilization** and implementing **load distribution, IP-rotation**, and fallback to achieve a **25% reduction** in costs.
  - Led integration of International marketplaces; establishing **company's presence** in 7 middle-eastern regions.
  - **Awards:** Above and Beyond Call of Duty (ABCD) Award [\[Certificate\]](#)
  - **Tech stack:** Spring Boot, Java, Mongo, SQL, Zookeeper, ActiveMQ, Elastic Search, AWS

## SKILLS SUMMARY

- **Programming:** C++, Python, JAVA, Shell Scripting, JavaScript, SQL, MATLAB
- **Robotics:** ROS(1&2), OpenCV, Gazebo, Sensor Fusion, Linux, 3D geometry
- **Tools:** Git/GitHub, Docker, Latex, AWS, Solidworks, LiDAR
- **AI/ML:** PyTorch, Scikit, NumPy, pandas, Matplotlib

## LEADERSHIP EXPERIENCE

- **Unicommerce eSolutions Pvt. Ltd.** Gurugram, India  
*Team Lead*  
*Dec 2021 - July 2022*
  - Reviewed the works of my team members, set up best coding 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 ([edX](#)), Robotics Specialization ([Coursera](#)), ROS for Beginners: Basics, Motion and OpenCV ([Udemy](#)), ROS for Beginners II: Localization, Navigation and SLAM ([Udemy](#)), Machine Learning ([Coursera](#)), Machine Learning A-Z™: Hands-On Python & R In Data Science ([Udemy](#)), Image Processing and Deep Learning ([PyImageSearch University](#))