Ayush Goel

Portfolio: ayushgoel24.github.io
Github: github.com/ayushgoel24

Email: aygoel@seas.upenn.edu
Mobile: +1 (267) 231-6755
LinkedIn: linkedin.com/ayushsgoel

Education

- **University of Pennsylvania, GRASP Lab** — Philadelphia, PA
  Master of Science - Robotics — *expected May 2024*
  Relevant Coursework: *Machine Learning, Machine Perception, Computer Vision*
- **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: *3^{RD} rank in Undergrad, Merit-based Scholarships for all 4 years*

Skills Summary

- **Programming**: C/C++, Python, JAVA, Shell Scripting, JavaScript, SQL, MATLAB, HTML, XML
- **Robotics**: ROS(1&2), OpenCV, Gazebo, Sensor Fusion
- **Tools**: Git/GitHub, Docker, Latex, AWS, Solidworks, Android Studio, Keil uVision, Proteus, MySQL, SQLite
- **AI/ML**: PyTorch, Scikit, NumPy, pandas, Matplotlib

Research Experience

- **Programme in Autonomous Robotics, IIT Delhi** — Delhi, India
  Research Intern — *Jan. 2017 - July. 2017*
  - Designed and developed a **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

Projects

- **Development of Semi-Autonomous Mobile Robot (RoboMuse3XT)** *[Video]*
  - Developed and installed a **4 degree-of-freedom Robotic Arm** with a payload capacity of **300 gm** on RoboMuse3XT
  - Implemented the **ROS Navigation Stack** to map the surrounding environment.
  - Performed **Pattern Recognition** to identify different **medical equipments**.
- **Object Following Robot using ROS and OpenCV** *[Github]*
  - Developed **RaspberryPi-based robot** chasing object using **PID control** & sensory data (Camera and LiDAR).
  - Created **ROS package** with three python scripts; one detecting centre of object being tracked from images; second for publishing angular position using LiDAR & camera data; third for sending appropriate velocity values to the actuators.
- **Augmented Reality** *[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.
  - **Mentored & managed team of Software Engineers** & ensured shipping of **high-quality products**; **fulfilling 80% more business requirements per sprint**. Based on contributions, I became **Team Lead**.
  - **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

Leadership Experience

- **Mechatronics and Robotics Society, TIET** — Punjab, India
  Convener — *Aug. 2017 - June 2018*
  - Responsible for **organizing robotic workshops & events, society's finance policies, and procedures**.

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*)