

# Ayush Goel

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

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## EDUCATION

- **University of Pennsylvania, School of Engineering and Applied Sciences** 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*  
*Awards: Certificate of Merit for 3 consecutive years*  
*Achievements: 3<sup>RD</sup> rank in Undergrad, Merit-based Scholarships for all 4 years*  
*June 2018*

## 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. [\[Report\]](#)
  - Worked on **CAD design, stress analysis, component selection, Odometry, PID control, PCB Designing, GUI development and programming of all components** of the robot. Developed and installed a **4 degree-of-freedom Robotic Arm** with a payload capacity of **300 gm**.
  - **Tech Stack:** Python, OpenCV, MATLAB, ROS, Solidworks, Proteus

## PROJECTS

- **Development of Semi-Autonomous Mobile Robot (RoboMuse3XT)** [\[Video\]](#)
  - Designed and developed a **Semi-Autonomous Mobile Robot** from **scratch** capable of being operated remotely or autonomously in a pre-defined path.
  - Incorporates the capabilities of **live video surveillance** and **face recognition** to **enhance security**.
  - It can **avoid obstacles** in its path and **interact with humans** with the help of a touchscreen and speakers.
  - The robot is **cheap and flexible**, and has implementations in several domains: **surveillance, industries, research**.
- **Development of Service Robot** [\[Poster\]](#)
  - 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** and developed an **Android application** to **recognize the voice commands**.
- **Object Following Robot using ROS and OpenCV** [\[Github\]](#)
  - Developed a **Raspberry Pi-based robot** that chases an object using **PID control** and a combination of sensory data (Camera and LiDAR).
  - Created a **ROS package** with three python scripts; one for detecting the centre of the object being tracked from images from Raspberry Pi; second for publishing angular position using LiDAR and camera data; third for sending appropriate velocity values to the actuators.

## 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 and managed a team of Software Engineers** and ensured shipping of **high-quality products and services**, thereby **fulfilling 80% more business requirements per sprint**. Based on my contributions, I was made the **Team Lead**.
  - **Reduced cost of infrastructure** by redesigning integrations for **optimal bandwidth utilization**. Researched and experimented with **residential and datacenter proxies** by implementing **load distribution, IP-rotation**, and fallback to achieve a **25% reduction** in costs.
  - Spearheaded integration of International marketplaces like Lazada and Shopee, establishing the **company's presence in 7 middle-eastern regions**.
  - Redesigned and pioneered the integration with **Amazon Marketplace (Smart Connect and Seller-Party Model)**, which led to **reduction of cost and an increase in the overall efficiency** of the processes by **20%**.
  - **Awards:** Above and Beyond Call of Duty (ABCD) Award [\[Certificate\]](#)
  - **Tech stack:** Spring Boot, Java, Mongo, SQL, Zookeeper, ActiveMQ, Elastic Search, AWS

- **Capgemini India Pvt. Ltd.** Maharashtra, India  
*Senior Software Engineer* *Sept. 2018 - June 2019*
  - Upgraded the financial services-web application of CIMB Bank, Malaysia by developing a banking project in a team of 10 to convert SOAP APIs to REST APIs.
  - Planned and headed the development of Capbook, a social media web application developed using AngularJS and Spring Framework, used by over 500 employees.
  - **Tech stack:** Spring, AngularJS, Java, REST, Yaml, Swagger

## LEADERSHIP EXPERIENCE

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- **Mechatronics and Robotics Society, TIET** Punjab, India  
*Convener* *Aug. 2017 - June 2018*
  - Secured an additional **Rs. 60,000** funding for the society to buy several new equipments.
  - Organized several robotic workshops and events, with an average footfall of over **500 people**.
  - Founded a competition, **INNOVATICA**, where around 25 student groups presented ideas to solve real-life problems and I helped them implement those.
  - Responsible for **society's finance policies, procedures, and controls**.

## EXTRA-CURRICULAR ACTIVITIES

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- Convener, Mechatronics and Robotics Society, TIET, India.
- Member of Organizing Committee, 3RD International Conference on Advances in Robotics held at IIT Delhi.
- Volunteer, Apna Ghar Vridh Ashram - senior citizen's home on the outskirts of Delhi, India.
- Volunteer, Pratigya Society - provided elementary knowledge to underprivileged children.
- Volunteer, SIYAAHI - an initiative towards environment protection, TIET, India.
- Founded a competition, INNOVATICA, to encourage robotics research in college, TIET.
- Participated in several inter-organization cricket tournaments, Capgemini, India
- Participated in Tryst - Technical Fest, IITD, India

## RELEVANT COURSEWORK

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- **Undergraduate Courses:** Control Systems, Advanced Control Systems, Robotics Engineering, Signals and Systems, Digital Signal Processing, Kinematics and Dynamics of Machines
- **Self-learned:** 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](#)), Python For Everybody Specialization ([Coursera](#)), Image Processing and Deep Learning ([PyImageSearch University](#))