Adesh Grewal

adeshgrewalwk@gmail.com | LinkedIn : https://www.linkedin.com/in/grewaladesh13/ | GitHub : https://github.com/AG-013 | Portfolio : https://ag-013.github.io/

Address: Baulkham Hills, Sydney, NSW, 2153
Mobile: +61 405-603-626

Valid 485 visa till **Aug 2028**

Professional Summary:

Robotics and Software Engineer with 4+ years of hands-on experience in real-time control, multi-sensor integration, and system-level development with a Master's in Robotics Engineering from UTS. I have a proven track record in designing and deploying robotic platforms which include assistive robotic arms (HRI) , autonomous race vehicles(FSAE) and vision-based manipulators. Skilled in C++, Python, MATLAB, ROS/ROS2, Linux, path planning, point cloud/image processing and GUI development with expertise in integrating hardware and software into field-ready robotic systems. Passionate about collaborating with research and industry teams to deliver innovative automation solutions to complex real-world challenges.

Core Skills:

- **Programming**: C++, Python, MATLAB, Embedded C (STM32, Arduino), Bash scripting
- **Frameworks/Tools**: ROS/ROS2, URDF, RViz, RQT , OpenCV, YOLOv11, Git, CI/CD workflows, Linux systems
- **Robotics Systems**: SLAM, Sensor Fusion, Multi-threaded Applications, Object-Oriented Programming (OOP), Path Planning (A*, PRM, Dijkstra, Frontier-based Exploration), PID Control
- **Perception & Vision**: RGB-D Cameras (Intel RealSense D435i), Image & Point Cloud Processing, Object Detection, Visual Servoing, Machine Learning
- **Hardware & Integration**: System Architecture Design, Hardware/Software Integration, Boston Dynamics Spot, Dobot Arm, Embedded Systems, Networking & Troubleshooting
- **Simulation & CAD**: SolidWorks, Ansys, Gazebo, Sim Centre
- **Soft Skills**: Technical Documentation, Cross-disciplinary Communication, Team Leadership, Problem Solving, Analytical Thinking

Education:

Master of Professional Engineering (Robotics)
University of Technology Sydney (UTS) — GPA: 5.56/7 Aug 2023 – June 2025

- **Graduate Project:** Robotic Arm-Equipped Guide Dog for the Visually Impaired
- **Key Study Areas:** Robot Exploration & Navigation, Autonomous Control, Real-Time Simulations, Project Management, Risk Assessment.

Bachelor of Mechanical Engineering
UIET, Panjab University — GPA: 5.0/7 Aug 2018 – July 2022

- **Graduate Project**: Autonomous Fixed Delta-Wing UAV for Aerial Surveillance

Selected Projects :

- **Assistive Robotics – Spot Integration** *(Graduate Project)* *May 2025*
  - Developed a 3-DOF robotic arm integrated with Boston Dynamics Spot for assistive guidance with Guide Dogs Australia.
  - Implemented tendon based actuation for lightweight, compliant HRI.
  - Designed full system (SolidWorks + FEA), workspace optimisation (MATLAB), URDF creation, PID tuning, embedded and hardware selection + 3D printed prototype manufactured.
  - Conducted testing ensuring reachability, safety, and back-drivability.

- **Vision-Based Manipulation (**Robotics Studio Coursework) *Dec 2024*
  - Programmed image-guided pick-and-place using RGBD cam, OpenCV, and eye-to-hand calibration.

- **Autonomous Navigation in Unstructured Terrain + Vision** (Space Robotics Coursework) *Dec 2024*
    - Implemented A*, Dijkstra, PRM, and frontier exploration.
    - Integrated YOLOv11 with LIDAR + RGBD for object detection; fused LIDAR, IMU, and camera data.
    - Full ROS stack simulation in Gazebo using Python.

- **Multi-Robot Collaboration & Land Surveying** - Programming for Mechatronics Systems *May 2025*
    - Developed C++ ROS2 control stacks for quadcopter, Ackermann-steer, and skid-steer robots.
    - Implemented multithreading for multi-agent coordination and efficient resource management.

- **Beer Brewing Automation Bootcamp** – UTS Tech Labs Dec 2023
    - Designed sensor-driven automated brewing system with real-time monitoring.
    - Developed Node-RED GUI for control and visualisation.
    - Optimised brewing process to reduce CO_2 emissions and improve efficiency.

- **Autonomous Delta-Wing UAV** *Mar 2022*
    - Designed and fabricated an autonomous surveillance drone with GPS waypoint tracking and gyro-stabilised flight.
    - Integrated and programmed Flymatek flight controller using ArduPilot for autonomous mission execution.

- **National Electric Kart Championship (NEKC 3.0)** *Mar 2020*
    - Led mechanical design for the winning team, focusing on ergonomics and responsive steering.

- **Auto India Racing Championship (AIRC)** *Feb 2020*
    - Contributed to chassis design and steering optimisation; the team placed 16th nationally.

Industry Experience:

Casual Academic – Mechatronics (MTRX1705)

University of Sydney Current

- Tutoring first-year engineering students in mechatronic systems, circuit design, and embedded platforms.
- Delivered hands-on lab sessions and troubleshooting support for projects.

Engineering Researcher – Acoustic Materials

UTS Tech Labs, Botany Bay *Oct 2023 – Nov 2024*

- Conducted laser vibrometer experiments to analyse damping materials.
- Performed mode shape analysis using Siemens SimCentre.
- Investigated structural response and evaluated materials for acoustic insulation performance.

Mechanical & Mechatronics Systems Lead

UTS Autonomous Motorsports *Feb 2024 – Jan 2025*

- Led 8-member mechanical team, enabling autonomous conversion of a race car platform.
- Designed dual-mode pedal box and Ackermann steering; achieved sub-3s system latency.
- Collaborated closely with electrical/software teams for full autonomous stack integration.

Graduate Trainee – Shot Blasting Optimisation

Mahindra & Mahindra, Swaraj *Jul 2022 – Sep 2022*

- Improved shot-blasting efficiency by analysing consumable usage.
- Overlooked PLC, SCADA and automation systems at the plant.

Systems and Integration Head

UIET Student motorsport teams (B-Ron racing , Immortus Racing) *July 2018- June 2022*

- Led the mechanical, electrical design for competitive go-karts.
- Managed requirements definition, component selection, and full integration.
- Competed in multiple national motorsport competitions.

Engineering Research Intern – Embedded Sensors

NTU & Panjab University *Jun 2021 – Feb 2022*

- Designed 3D-printed RF sensors using recycled plastic blends.

- Investigated dielectric property variations and their effect on antenna gain.
- Publication: Springer Journal (RF-Based 3D-Printed Sensors). https://link.springer.com/article/10.1007/s12046-022-01992-2

Leadership & Volunteering:

- Well-being Representative, Activate UTS (Nov 2023 – Dec 2024)
- Executive Member, SJOBA Alumni Association (May 2018 – July 2023)

References:

Dr. Marc Carmicheal – UTS – Robotics Institute- Marc.Carmichael@uts.edu.au

Dr. Can Nerse – UTS Tech labs - Can.Nerse@uts.edu.au