

# Shantanu Nitin Ghodgaonkar

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## EDUCATION

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**New York University**, Tandon School of Engineering

M.Sc. Mechatronics, Robotics and Automation Engineering

**Visvesvaraya Technological University**, Bangalore Institute of Technology

B.E. Electronics and Instrumentation Engineering

## EXPERIENCE

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**Robotics Engineer** | BotCrew LLC | TX, USA

*Jun 2025 – Present*

- Leading full-stack software development of a **7-DoF robotic arm** integrated atop a **mobile robot**.
- Built a **modular, platform-independent C++ framework** for control and planning across **ROS 2, Fast DDS, and RTOS**.
- Designed a **collision-aware inverse kinematics (IK)** solver converging in **70–80 ms** to produce stable goal states.
- Developed a joint-space **Model Predictive Controller (MPC)** running at **20 Hz** with position and velocity limits.
- Implemented a **motion-planning pipeline** using **OMPL (RRT-Connect)** with self- and environment-collision checks.
- Built a **PCD-to-SDF** module enabling **environment-aware motion planning from 3D sensor data**.
- Programmed **low-level communication and actuator-control loops** for **hydraulic actuation** and future servo integration.
- Developed a **Zero-G Controller** mode within the same ecosystem for human guidance control input.
- Validating control and planning algorithms in **CoppeliaSim, MuJoCo and Isaac Lab**, targeting **Jetson Thor** deployment.

**Adjunct Professor** | New York University | NY, USA

*Jun 2024 – Jun 2025*

- Taught **control systems** using **C++, Python, MATLAB, and Simulink**, focusing on **PID, LQR, and MPC**.
- Instructed students on **Standard Operating Procedures** for lab equipment including **oscilloscopes and function generators**.
- Demonstrated the use of the **Allen Bradley PLC** to students, getting them ready for **real-world challenges**.
- Designed and troubleshooted **motion planning** for a **mobile hexapod** using **ROS Humble** and real-world testing.
- Monitored and optimized **robotic performance** by debugging **simulation-to-hardware discrepancies** in **MuJoCo**.
- Utilized **Linux, Bash, and Git** for **version control, system integration, and testing** for the **hexapod**.
- Documented **control algorithms, system configurations, and troubleshooting steps** for improved **system reliability**.
- Guided students in **debugging robotics issues**, adapting explanations to different skill levels for better learning.
- Researching and testing applicable **Reinforcement Learning** strategies for **Vision-based Control** of the mobile hexapod.

**Software Engineer** | Bosch Global Software Technologies | Bengaluru, India

*Sep 2021 – Jul 2023*

- Built and maintained **diagnostic tools** for **ODX data processing**, ensuring seamless integration into **automotive systems**.
- Identified and resolved **software issues** in **diagnostic tools**, enhancing performance and reducing **debugging time** for **INEOS**.
- Documented **system errors** and submitted **Jira tickets** for issues requiring **senior engineering team support**.
- **Collaborated** with engineering teams to improve **software stability**, cutting **development time** by **70%** with **automation**.
- Developed **Python scripts** to **automate repetitive tasks**, significantly improving **personal efficiency** by **40%**.
- Used **Git** and **Subversion** for **version control** and set up a **Jenkins CI/CD pipeline** for **automated deployment**.
- Updated **documentation** on **sys-op, troubleshooting, and deployment process**, ensuring **clear knowledge transfer**.
- Trained **client technicians** and **internal teams** on **new software workflows**, improving **operational efficiency**.
- Conducted **on-site debugging** and **system validation**, **deploying and integrating tools** for **various clients**.
- Worked in **Agile sprints** using **Jira**, maintaining a **90% on-time delivery rate** while managing **multiple automotive projects**.
- Took on additional responsibilities, including **client-facing roles, training new joiners, and conducting interviews**.
- Earned **recognition and rewards** from **management** for contributions in improving **team performance** and **client satisfaction**.

## TECHNICAL SKILLS

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**Control Systems:** PID, LQR, Numerical Optimization, ProxQP, OSQP, Model Predictive Control

**Robotics & Motion Planning:** Pinocchio, OMPL, nvblox, CoppeliaSim, MuJoCo, ROS 2 Humble, CycloneDDS

**Programming & Tools:** C++, Python, C, Embedded C, CUDA, CMake, Docker, Git, Linux Bash

**Simulation & Hardware:** Nvidia Jetson, Raspberry Pi, Arduino, ESP32, STM32 (Moteus X1)

**Libraries & Frameworks:** PyTorch, OpenCV, SciPy, MATLAB/Simulink, MATLAB Robotics Toolbox

**Communication Protocols:** UART, USB, I2C, SPI, CAN, CAN-FD, BLE, WiFi, MQTT, Dynamixel Protocol 2.0

**Tools & Others:** Git, Subversion, Docker, Jira, LabVIEW, LPKF CircuitPro, Altium, Eagle, KiCad, Overleaf