

# Shantanu Nitin Ghodgaonkar

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## TECHNICAL SKILLS

**Programming Languages:** Python, C++, C, Java, HTML, CSS, JavaScript, XML  
**Frameworks & Libraries:** PyTorch, ROS Humble, OpenCV, SciPy, Pinocchio, Simulink, MATLAB Robotics Toolbox  
**Robotics Fundamentals:** 3D and Epipolar Geometry, Linear Algebra, Kinematics, Dynamics, Probability, Statistics  
**Robotics Platforms:** Universal Robotics UR16, CoppeliaSim, ROS, Nvidia Jetson Nano, Raspberry Pi, Arduino, ESP32  
**Control Systems:** PID Control, LQR Control, Model Predictive Control, Numerical Optimization  
**Tools & Others:** Git, Subversion, CUDA, Jira, Confluence, LabVIEW, EasyEDA, Overleaf

## EDUCATION

**New York University**, Tandon School of Engineering Sep 2023 - Present  
Master of Science in Mechatronics, Robotics and Automation Engineering  
*Relevant Coursework:* Robot Localization & Navigation, Robot Perception, Reinforcement Learning & Optimal Control for Robotics  
**Visvesvaraya Technological University**, Bangalore Institute of Technology Aug 2017 - Aug 2021  
Bachelor of Engineering in Electronics and Instrumentation Engineering  
*Relevant Coursework:* Control Systems, Virtual Instrumentation, Digital Image Processing, Neural Networks & Fuzzy Logic Systems

## EXPERIENCE

**Adjunct Professor** | NYU Tandon School of Engineering | NY, USA Jun 2024 - Present  
• Instructed the Automatic Control Laboratory (ME-UY 3411), emphasizing PC-based data acquisition, PID control, LQR control, and real-time control systems, for both linear and non-linear systems.  
• Guided students in programming a UR16 robotic arm, highlighting path planning and error handling to strengthen practical robotics skills.  
• Spearheaded the development of control algorithms for a 7-DOF hexapod robot, leveraging numerical optimization methods to achieve a 20% improvement in stability.  
• Optimized the robot's foot design by analyzing mechanical CAD drawings, enhancing traction and load distribution.  
• Designed the hexapod's electrical and computing subsystems through the development and validation of electrical schematics prior to manufacturing, ensuring robust system integration.  
• Introduced Poke-Yoke principles to enhance reliability and reduce common assembly errors in the electrical design processes.  
• Scalable Trajectory Optimization, Motion Planning algorithms developed for the Hexapod can extend to humanoid robots.  
• Utilized MuJoCo within CoppeliaSim for comprehensive robot simulations, validating precomputed gait patterns and reducing physical testing time by 30%, upon deployment on the real robot.  
• Currently implementing multi-threaded vision and contact rich Model Predictive Control algorithms, improving the robot's interaction with complex environments, using ROS Humble.  
• Preparing an Unscented Kalman Filter for robust state estimation under uncertainty, bolstering sensor fusion capabilities.

**Associate Software Engineer** | Bosch Global Software Technologies | Bengaluru, India Sep 2021 - Jul 2023  
• Developed and maintained Java-based Automotive Diagnostic Tools for ODX data processing & automation.  
• Built an ANTLR-based A2L parser for Daimler, completing the project 4 months ahead of schedule.  
• Led the development of a customized automation tool for INEOS, reducing development time by 70%.  
• Created internal software automation tools that sped up ODX error resolution by 40%.  
• Verified ODX data and conducted ECU simulation testing using OTX for McLaren.  
• Supported the development of HTML, CSS, and JQuery-based screens for GRADE-X, reducing lead time by 10%.  
• Authored diagnostic content for Flashing Over-The-Air (FOTA) product prototyping.  
• Managed Agile sprints with Jira, maintaining a 90% on-time delivery (OTD) rate.  
• Served as a Technical Interviewer and produced a training video library, reducing developer onboarding time by 30%.

**Diagnostic Content Engineering Intern** | Bosch Global Software Technologies | Bengaluru, India Mar 2021 - Jun 2021  
• Developed OTX screens for ECU simulation using HTML, CSS, and JavaScript to support diagnostic workflows.  
• Integrated and validated OTX screens for vehicle testing in diagnostic systems.  
• Collaborated with cross-functional teams to improve ECU simulation accuracy and streamline workflows.

## PROJECTS

**Obstacle-Aware Control of 2D Quadrotor using PPO in Custom Reinforcement Learning Environment** | [GitHub](#) Dec 2024  
**Deep Q-Learning to solve Linear Inverted Pendulum problem using PyTorch** | [GitHub](#) Nov 2024  
**Comparison between Value and Policy Iteration over Grid World** | [GitHub](#) Oct 2024  
**Trajectory Optimization and MPC for a 2D Quadrotor** | [GitHub](#) Sep 2024  
**Hexapod Robot Development** | [GitHub](#) Sep 2024 – Present  
**Maze Solving Robot using Raspberry Pi and Arduino** | [GitHub](#) May 2024  
**Vision and IMU Fusion with Unscented Kalman Filter** | [GitHub](#) April 2024