

# Varun Nayak

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<b>OBJECTIVE</b>	Seeking <b>full-time</b> opportunities in the <b>robotics</b> industry to apply knowledge in <b>controls, planning and estimation</b> to develop autonomy stacks for <b>mobile robots</b> and <b>robotic manipulators</b> , starting March 2020.	
<b>EDUCATION</b>	<b>Stanford University</b> , USA	2018 – 2020
	M.S. Mechanical Engineering (Specialization: Robotics)	CGPA: 4.1/4.0
	<b>Birla Institute of Technology and Science (BITS), Pilani</b> , India	2014 – 2018
	B.E. (Honors) Mechanical Engineering	CGPA: 9.30/10 (Rank 4)
<b>INDUSTRY EXPERIENCE</b>	<b>Robotics Software Intern</b> , <b>Auris Health, Inc.</b> Redwood City, CA Jun 2019 – Sep 2019 <ul style="list-style-type: none"><li>Implemented and tested an <b>impedance-based control</b> mode for a multi-DoF robot arm: <b>production-level software written in C++</b> suitable for use in a <b>safety-critical</b> environment.</li><li>Participated in <b>code reviews</b> and developed several supporting features including <b>Qt</b> widgets by <b>collaborating</b> with ME, EE and Systems Engineers.</li></ul>	
<b>KEY PROJECTS</b>	<b>Crokinole-Playing Robot</b> , Experimental Robotics, CS225A, Stanford University Jan 2019 – Mar 2019 <ul style="list-style-type: none"><li>Developed a <b>trajectory planner (using vision)</b> and a <b>control policy</b> for a <b>7-DoF Panda Serial Manipulator</b> to play the game of <i>Crokinole</i> against a human. Written in <b>Python/C++</b>.</li></ul>	
	<b>Delivery Robot</b> , Principles of Robotic Autonomy, AA274, Stanford University Jan 2019 – Mar 2019 <ul style="list-style-type: none"><li>Implemented autonomous exploration, <b>motion planning</b>, <b>EKF-SLAM (using LiDAR)</b> and image classification algorithms on a <b>Turtlebot</b> using <b>ROS (Python)</b> in a mock environment.</li></ul>	
	<b>Mobile Robot (Mechatronic Development)</b> , ME218, Stanford University Oct 2018 – Mar 2019 <ul style="list-style-type: none"><li>Designed and developed the HW and SW systems for <b>navigation</b> using <b>inductive, ultrasonic and infrared sensors</b> as well as for ball collection and sorting.</li><li>The software was developed using <b>C</b> and utilized <b>hierarchical state machines</b>.</li></ul>	
	<b>Vehicle Dynamics, Control and Estimation</b> , ME227, AA273, Stanford University Jan 2019 – Mar 2019 <ul style="list-style-type: none"><li>Analyzed the <b>nonlinear dynamics</b> of a Volkswagen Golf on <b>MATLAB</b> and implemented <b>Lookahead, PID, and LQR</b> control to accurately track (error &lt; 30 cm) an oval path.</li><li>Implemented <b>EKF, UKF and PF</b> filters for side-slip angle estimation given IMU data.</li></ul>	
	<b>Bhabha Atomic Research Centre</b> , Mumbai, India Mar 2018 – Jul 2018	
<b>RESEARCH</b>	Robust Forward Kinematics Solver for a 6-DoF Parallel Manipulator <ul style="list-style-type: none"><li>Developed fast and robust <b>forward kinematics</b> using recursive backtracking, written in <b>C++</b>.</li></ul>	
	<b>Autonomous Robots Lab, University of Nevada, Reno, USA</b> Aug 2017 – Dec 2017	
	<b>Bachelor's Thesis</b> under Dr. Kostas Alexis: Aerial Manipulation, Design and Control <ul style="list-style-type: none"><li>Developed the <b>kinematics and nonlinear control</b> for a 3-DoF aerial manipulator on <b>MATLAB</b>.</li><li>Implemented the entire control policy using <b>ROS (Python)</b> on an intel i7 NUC commanding a DJI M100 Quadrotor, interfaced using <b>Arduino</b>.</li></ul>	
<b>AWARDS</b>	Recognized by the <b>French Government</b> for developing <b>affordable intelligent prosthetics</b> . Fellowships awarded by <b>Indian Academy of Sciences</b> , <b>Indian Institute of Technology</b> and <b>BITS</b> .	
<b>LEADERSHIP/TEACHING</b>	<b>Teaching Assistant</b> : Dynamic Systems, Vibration and Control, Stanford University Autumn 2019 <ul style="list-style-type: none"><li>Undergraduate course in the basics of dynamics and control with a laboratory component.</li></ul>	
	<b>Campus Coordinator</b> : Drone/Aeromodelling Club, BITS 2016-17 <ul style="list-style-type: none"><li>Lead the student aeromodelling club for one year and organized the first ever campus drone workshop. Represented BITS at national level technical festivals and outreach events.</li></ul>	
	<b>Robotics Instructor</b> : Workshop for middle school students, Stanford University Summer 2019 <ul style="list-style-type: none"><li>Taught students the fundamentals of robotics through demonstrations on a Lego® kit.</li></ul>	
<b>TECHNICAL SKILLS</b>	<b>Software Tools</b> : Linux, Git, JIRA(Agile), MATLAB, ROS, SolidWorks, MS Office. <b>Languages</b> : C/C++, Python:Num/SciPy, Bash	