

ABHIDIPTA MALLIK

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<https://www.youtube.com/channel/UC93YLhxZU2naTbgGPICWYvw>

PROFILE

Accomplished and enthusiastic Doctoral student with experience in research and development of robotic and control systems. Proven history of leadership and teaching roles, and involvement in a broad range of projects and experimental work. Objective is to contribute multidisciplinary skills and experience to the research and development of emerging technologies.

EDUCATION

- New York University**, Tandon School of Engineering, New York, NY Aug 2016- Aug 2020
PhD in Mechanical Engineering (focus on Mechatronics and Robotics)
- *Thesis*: Towards enhancement of technology education through robotics workshops and development of AR/VR-based testbeds (Advisor: Professor Vikram Kapila)
- Indian Institute of Engineering Science and Technology**, Shibpur, India July 2012-June 2014
Master of Technology in Mechatronics | *Honors*: First Division
- *Thesis*: Design and implementation of obstacle detection, avoidance algorithm and control of an intelligent robot
- West Bengal University of Technology**, Kolkata, India July 2008- June 2012
Bachelor of Technology in Electronics and Communication Engineering | *Honors*: First Division

EXPERIENCE

- Project Fellow*, **Central Mechanical Engineering Research Institute**, India September 2014 to July 2016
- Collaborated with other fellows on project "Force reflecting system with motion sensing for evaluation of human grasping action"
 - Involved with coding, circuitry and control aspect in the development of hand exoskeleton for rehabilitation purpose with the ultimate goal of hand gesture detection and pattern recognition
 - Supported application of the system for tele-operation and building a model from example inputs so that the system could make data-driven predictions/decisions expressed as outputs instead of following static program instructions
 - Developed Sliding mode controller for Pneumatic Actuator Muscle
- Research Assistant*, **New York University**, New York, NY August 2016 to August 2020
- Performed robotics and mechatronics research in AR/VR and ML
 - Facilitated and served as main faculty for Innovative Technology Experiences for Students and Teachers (ITEST)
 - Developed and delivered robotics-based curriculum to participants and carried on engineering education research with the participants (44 teachers and 90 students)
 - Helped schools such as Brooklyn Technical High school, St. Joseph High School with the curriculum and planning for robotics class during the academic year
- Startup experience: Development Engineer, Library Assistant*, New York, NY September 2020 -Present
- Developed shelf scanning robot for tracking misplaced books in library using computer vision and machine learning
 - Enabled readers to search their desired book on the phone attached and find the exact book

TECHNICAL SKILLS

- Programming Languages: C, Data Structure, C++, (VHDL), C#, Python, Java
- Other Tools: Robotics, Mechatronics, AR/VR, Control System (sliding mode, adaptive, vision based, LQR, PID), Robot kinematics, Signal Processing, Image processing, human subject experiments, Deep learning, Neural network, App development
- Software: Unity, ARM DS-5, KIELuvision, mbed online compiler, Solidworks, Matlab, Simulink, multsim, Labview, Blender animation, ARCore, ROS
- Hardware: ARM1176JZF-S, ARM Cortex M-3,8051 μ c, Phantom Haptics, NI cRIO-9074, Arduino Yun, Raspberry Pi, Lidars

MEMBERSHIPS AND PROFESSIONAL DEVELOPMENT

- *Reviewer*, Journals: ASEE, IEEE
- Introduction to The Robot Operating System (ROS2), Coursera, 2020
- Machine Learning on Google Cloud, Coursera, 2020

ADDITIONAL ACHIEVEMENTS

- Qualified Graduate Aptitude Test for Engineers (ranking in 97th percentile) and received scholarship for my Masters degree from the government of India
- Achieved certificates (about 30) and medals in swimming for representing school and club at regional level
- Was part of core committee for organizing College Fest 2010 and took active part to make it a success
- Volunteered at Project HAPPY - Hunter College C&T, NY teaching swimming to autistic children

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February 5, 2021

MBARI,

Dear Hiring Manager,

I am writing to apply for a full-time position at MBARI. I recently completed my PhD at New York University. I received my degree from the Mechatronics, Controls, and Robotics Lab, Department of Mechanical & Aerospace Engineering under Professor Vikram Kapila. My Ph.D. thesis title is "Towards enhancement of technology education through robotics workshops and development of AR/VR-based testbeds". For my Ph.D., I worked in engineering education and the development of testbeds for interactive learning of forward and inverse kinematics of a planar and mobile robot kinematics, computer vision, control system genetic algorithms, tensor flow and neural networks. I am confident that the technical and research experience gained from my PhD, combined with my communication and leadership experience, will enable me to contribute immediately to MBARI.

As part of PhD, I have worked in group projects to design 'Smart bus handle' for people with short height using BS2 microcontroller, 'Pole climbing robot' using Arduino, 'Delivery robot' using Propeller, 'Collect and deliver robot' using Raspberry pi 3, 'Controlling a robot manipulator by human gesture using Kinect sensor', 'Dynamic obstacle avoidance and path planning using sensor integration' involving Arduino and Kalman filter. For the course Networked Robotics Systems, Cooperative Control and Swarming, I learnt graph theory thoroughly and solved simulation project in Gazebo for swarm formation and control. (Youtube channel: <https://www.youtube.com/channel/UC93YLhxZU2naTbgGPICWYvw>). After graduation I started working on my own startup the Library Assistant Robot which is a platform that can help library staff manage books effectively, efficiently and easily. It stores map of a library and its books database along with their actual position. When library is closed it goes along the shelves and scans books using computer vision and barcode scanning. It generates a report about misplaced books current position and their actual position to help to re-organize them.

I also gained professional experience as a Project Fellow in Virtual prototyping and immersive visualization lab (presently called Advanced Design and Analysis Group) in the Central Mechanical Engineering Research Institute, Durgapur, India. I was attached to the project "Force reflecting system with motion sensing for evaluation of human grasping action" where I was assigned the coding, circuitry, and controlling part of the project. Here we were developing hand exoskeleton for rehabilitation purpose with the ultimate goal of hand gesture detection and pattern recognition and application of the system for tele-operation and building a model from example inputs so that the system was able to make data-driven predictions or decisions expressed as outputs instead of following strictly static program instructions. There I worked on softwares Matlab Simulink and Labview and hardwares NI cRIO-9074, Arduino Yun. I designed sliding mode controller using nonlinear curve fitting method.

Prior to securing Junior Research Fellowship and starting working in central government research laboratory Central Mechanical Engineering Research Institute, I did an M.Tech in Mechatronics from IEST, Shibpur, India. Established in 1856 it is one of the oldest and prestigious engineering colleges of the country and is classified as an Institute of National Importance by the Government of India. I got the admission in the institute because I did extremely well (ranking in 97th percentile) in Graduate Aptitude Test for Engineers (GATE) and the interview that followed. I received government scholarship during my graduate course. I have done my second-year project in CSIR-CEERI, Pilani under the guidance of Dr. Kota Solomon Raju, Principal Scientist. The title of my master's thesis was ' Design and implementation of obstacle detection and avoidance algorithm and control of an intelligent robot' and in due course I developed a rudimentary floor cleaning device which detects and avoids obstacles and at the same time sweeps, wiping the surface.

I have worked in ROS and Robotic motion planning for my startup and have taken the course Introduction to The Robot Operating System (ROS2), Coursera, 2020. Currently I am enrolled in Motion Planning for Self-Driving Cars course in Coursera. I have experience in working in Linux kernels and with robotic control applications. My background with Bachelors in Electronics and Communication Engineering, a Masters in Mechatronics, work experience at a research institute, and a Ph.D. from NYU have enhanced my technical knowledge and capabilities. As someone who is committed to supporting the development of emerging technologies, I look forward to the opportunity to further discuss how I can make an impact to MBARI. Thank you for your time and consideration.

Best Regards,
Abhidipta Mallik