RAHUL MITRA

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EDUCATION

Boston University September 2021 - Present
Ph.D. in Computer Science
Advisor: Dr. Edward Chien

Trinity College, CT September 2017 - May 2021
B.S., Computer Science (honors) & Physics (honors) GPA: 3.95/4.0
Summa Cum Laude, Phi Beta Kappa inductee
Relevant coursework: Advanced Algorithms, Operating Systems, Programming Languages, Differential Equations, Multivariable Calculus, Quantum Mechanics, Electrodynamics, Experimental Physics

RESEARCH EXPERIENCE

Real-time Object Detection Aid for the Visually Impaired Sep 2020 - May 2021
Department of Computer Science, Trinity College *Advisor: Dr. Peter Yoon*

- Built white cane, enhanced with a microcomputer, to identify objects and provide audio feedback in real-time.
- Configured Jetson Nano high-performance microcomputer for efficient object identification using a trained model.
- Developed iOS application for audio feedback and seamless interfacing between user and enhanced white cane.
- Winner of best thesis award based on completeness, technical maturity and relevance.

Contact Sensing via Active Oscillatory Actuation (Pub. 2) Mar 2020 - Jul 2020
Department of Engineering, Trinity College *Advisor: Dr. Kevin Huang*

- Designed and built a low-cost, low-intrusion vibration-based contact sensor.
- Implemented machine learning models to classify exact location of contact.

Vision-based Force-Feedback in RMIS (Pub. 3) Jan 2020 - Mar 2020
Department of Engineering, Trinity College *Advisor: Dr. Kevin Huang*

- Examined the extent to which haptic feedback could deviate from ground truth while still resulting in an acceptable teleoperated performance in robot-assisted minimally invasive surgery (RMIS).
- Developed mathematical model for node-to-node interaction in simulated tissue surface.

Haptic Interface for Legged Robot Locomotion (Pub. 4 & 1) Apr 2019 - Mar 2020
Department of Engineering, Trinity College *Advisor: Dr. Kevin Huang*

- Developed software and experimental protocol to compare a haptic feedback interface vs a keyboard interface and a joystick interface for legged robot locomotion.
- Implemented data analysis models to interpret results from user study.

Sampling of 3DOF Manipulator Joint-Limits for Haptic Feedback (Pub. 5) Dec 2018 - Jul 2019
Department of Engineering, Trinity College *Advisor: Dr. Kevin Huang*

- Implemented point cloud generation/retrieval models for providing haptic feedback in teleoperated robots.
- Presented research paper at the IEEE International Conference on Advanced Robotics and Mechatronics (ICARM), 2019, Osaka.

PUBLICATIONS

1. K. Huang, D. Subedi, **R. Mitra**, I. Yung, K. Boyd, E. Aldrich, D. Chitrakar,"Telelocomotion—Remotely Operated Legged Robots", Applied Sciences 2021, 11, 194.
2. **R. Mitra**, K. Boyd, D. Subedi, D. Chitrakar, E. Aldrich, A. Swamy, K. Huang,"Contact Sensing via Active Oscillatory Actuation", IEEE International Conference on Mechatronics, Robotics and Automation (ICMRA), Shanghai, China, 2020.
3. K. Huang, D. Chitrakar, **R. Mitra**, D. Subedi, Y.H. Su,"Characterizing Limits of Vision-Based Force Feedback in Simulated Surgical Tool-Tissue Interaction", Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Montreal, Canada, 2020.

4. D. Chitrakar, **R. Mitra**, K. Huang,"Haptic Interface for Hexapod Gait Execution", IEEE International Conference on Robotic Computing (IRC), Taichung, Taiwan, 2020.
5. K.Huang, Y.H. Su, M. Khalil, D. Melesse, **R. Mitra**,"Sampling of 3DOF Robot Manipulator Joint-Limits for Haptic Feedback", IEEE International Conference on Advanced Robotics and Mechatronics (ICARM), Osaka, Japan, 2019.

PRESENTATIONS

1. "Real-time Object Detection Aid for the Visually Impaired", Computer Science Senior Thesis Presentation, 2021.
2. "Sampling of 3DOF Robot Manipulator Joint-Limits for Haptic Feedback", IEEE International Conference on Advanced Robotics and Mechatronics (ICARM), Osaka, Japan, 2019.
3. "Telelocomotion - Remotely Operated Legged Robots", Trinity College Summer Research Symposium, 2019.

TEACHING & SERVICE

Head Teaching Assistant, Data Structures and Algorithms (CPSC 215) Feb 2021 - May 2021
Department of Computer Science, Trinity College

Teaching Assistant, Mechanics (PHYS 141) Sep 2020 - Dec 2020
Department of Physics, Trinity College

Teaching Assistant, Data Structures and Algorithms (CPSC 215) Jan 2020 - May 2020
Department of Computer Science, Trinity College

President, Trinity College Chapter of IEEE Sep 2019 - Jan 2020
Department of Engineering, Trinity College

Mentor, Introduction to Engineering Design: Mobile Robots (ENGR 120) Jan 2019 - May 2019
Department of Engineering, Trinity College

Teaching Assistant, Introduction to Computing (CPSC 115) Jan 2019 - May 2019
Department of Computer Science, Trinity College

Teacher, Teach the Teachers Program Jun 2018
Department of Engineering, Trinity College

- Introductory robotics program aimed at school teachers with the goal of having more robotics curriculum in Hartford middle schools.

TECHNICAL SKILLS

Programming Languages	Java, Python, C/C++, HTML, CSS, JavaScript, Arduino programming language, MATLAB, Mathematica, SQL, familiar with Standard ML
Software and Technologies	Git, Raspberry Pi, Arduino Board, LATEX, familiar with ROS
Natural Languages	English, Hindi, Bengali

HONORS AND AWARDS

† Senior Research Prize (best thesis), Department of Computer Science Spring 2021

† President's Fellow, Department of Physics Fall 2020

† Albert J. Howard Jr. Prize in Physics Spring 2020

† Phi Gamma Delta Prize in Mathematics Spring 2020

† Faculty Honors All Semesters

† Herbert J. Hall Scholar All Semesters

† Full Tuition Scholarship 2017 - 2021

†= Awarded at Trinity College