

Ranul Vithanage

Undergraduate, University of Moratuwa, Moratuwa, Sri Lanka

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RESEARCH INTERESTS

Human-Computer Interaction, Human-Robot Interaction, Robotics, Computer Vision, Autonomous Systems

EDUCATION

University of Moratuwa, Moratuwa, Sri Lanka

BSc Eng (Hons) in Mechanical Engineering

Dean's List in Semesters 1, 2, 6, and 7

January 2020 — Present

Cumulative GPA: 3.71/4.20

PUBLICATIONS

Smart Music Therapist 1.0: Rhythmic Auditory Stimulation Integrated Robotic Walker as a Therapeutic Companion for Gait Rehabilitation

(submitted to IEEE International Workshop on Robot and Human Communication (RO-MAN) 2024)

- Robot-facilitated Music Therapy towards a semi-autonomous solution for gait rehabilitation.
- Telerehabilitation platform for Music Therapist to remotely monitor and consult patients
- Intelligent companionship (voice interaction, graphical user interface, music recommendation, etc.) integrated with a robotic walker fusing rehabilitation and socially assistive robotics.

Robust Autonomous Summoning Capabilities for a Patient Assistive Mobile Robot

(submitted to IEEE International Conference on Advanced Robotics and Mechatronics (ICARM) 2024)

- LiDAR-based SLAM for Localization and Mapping
- Sound Source Localization for out-of-line-of-sight navigation
- Gesture Recognition and Depth estimation by Stereo Vision for line-of-sight navigation

Design and Simulation of a Thermally Actuated Microgripper with a Compliant Bistable Release Mechanism for Biomanipulation

(submitted to Moratuwa Engineering Research Conference 2024)

- MEMS-based Microgripper with an Active Plunger working on the principle of Bistable Compliant Mechanism
- Novel Design featuring Double and Cascaded V-shaped (Chevron-shaped) actuators

Intelligent Robotic Walker with Adaptive Walking and Standing Assistance

(submitted to Moratuwa Engineering Research Conference 2024)

- Fabrication Process of the Robotic Walker with inbuilt sit-to-stand assistance mechanism
- Experimental evaluation of compliance to ISO standards

PROJECTS

Design and Development of a Multi-functional Robotic Walker

- Able to autonomously be summoned to the user's location without relying on Indoor Positioning Systems (IPS).
- Provides active user guidance suiting the user's pace with intuitive control methodology
- Provides sit-to-stand assistance upon the estimation of user height through computer vision
- Performs onboard Gait Analysis using a walker-mounted 2D LiDAR device and user-worn IMU
- Performs Emotion recognition and posture analysis for fatigue and emergency detection

Design and Development of a Remote Monitoring Robot for Gait Rehabilitation

- Performs Rhythmic Auditory Stimulation as a rehabilitation aid for users with gait disorders
- Able to monitor real-time gait data remotely by a medical professional using wearable IMUs worn by the user
- Provides feedback for gait improvement to the user even without external monitoring

More information on projects available at ranulv.github.io

PROFESSIONAL EXPERIENCE

Dipped Products PLC

Industrial Automation Intern

Kottawa, Sri Lanka
January 2023 — June 2023

- Designed a Glove Washing Station following a Latex Dipping Tank for an automated production line
- Designed an automated glove folding mechanism that integrates with a conveyor belt.
- Designed an automated glove cuff-cutting mechanism for Supported gloves improving safety and efficiency
- Designed an automated mechanism for transferring glove formers from drying ovens to latex dipping stations
- Completed 3D designs and detailed drawings for fabrication of components in Glove manufacturing plants

AIESEC in Nepal

National Head of Talent Management and Organizational Development

Kathmandu, Nepal
July 2022 — January 2023

- Responsible for Membership Experience Program (MXP) implementation
- Responsible for the National Project Managers
- Responsible for the National Ethics Subcommittee and Membership Subcommittee
- Management of the Talent Management Commission and Network
- Responsible for implementation of the Organizational Development (OD) model
- Responsible for local entity process assessment, improvement, and coaching

COURSES

Bachelor's Courses

- | | |
|--|---------------------------------------|
| • Robotics Technology | • Biomedical Engineering Applications |
| • Object Oriented Programming Using C++ | • Calculus |
| • Control Systems & Instrumentation | • Linear Algebra |
| • Industrial Automation | • Operational Research |
| • Micro/Nano Electro Mechanical Systems and Nanotechnology | • Applied Statistics |
| | • Graph Theory |

Additional Courses

CIMA (Chartered Institute of Management Accountants)

Certificate Level Completed (Self-learned)

VOLUNTEERING EXPERIENCES

Diriya Arunalu (Link)

Co-Founder & Educator

Galle, Sri Lanka
Jan 2019 - Dec 2019

- Co-founded the initiative to support Mathematics education in underprivileged schools in Galle
- Organized numerous teaching sessions in correspondence with school management
- Taught Mathematics to students in Grades 10 and 11 preparing for the G.C.E. O/L Examination
- Organized book donations among peers to donate to ill-resourced libraries in the local area

SKILLS

- **Programming:** Python, C++, MATLAB
- **Frameworks:** ROS, Gazebo
- **Libraries:** OpenCV, Numpy, Matplotlib, SciKit-Learn, TensorFlow, PyTorch

- **Software:** SOLIDWORKS, COMSOL, Solid Edge
- **Soft Skills:** Collaboration, Critical thinking, Written/Oral communication.

REFERENCES

Prof. Y.W.R. Amarasinghe

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Dr. Palitha Dassanayake

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