Thiwanka Alahakoon

Department of Mechanical Engineering
Faculty of Engineering
University of Peradeniya
Sri Lanka

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Research Interests

I am passionate about exploring the intersections of origami structures, 3D modeling, simulations, robotics, AI, and computer vision. My focus lies in research and development that combines these technologies to push the boundaries of innovation, especially in automobile, aerospace, and additive manufacturing engineering. Driven by curiosity, I aim to create integrated solutions that tackle complex challenges in smart, adaptive systems.

Teaching Experience

Teaching Assistant *University of Peradeniya*
Department of Mechanical Engineering *Jan 2024 – Present*

- Supervise Engineering Drawing (manual and AutoCAD) and Machine Design (SolidWorks) sessions, Mechatronics Systems Labs etc. focusing on practical knowledge and development of critical thinking.

Visiting Lecturer *Middlesex University*
Middlesex University, Australian College of Business and Technology, Kandy. *Oct 2024 – Present*

- teaching sessions on "Calculus and Algebra","Mechanics" & "Physics"

Casual Instructor *University of Peradeniya*
Department of Mechanical Engineering *Oct 2023 – Dec 2024*

- Led sessions on Design and Innovation, focusing on 3D modeling and conceptual project design using SolidWorks, and supervised mechatronics labs with PLC, Arduino, and LabView.

Working Experience

Autonomation Engineer Intern *Jan 2022 - June 2022*
MAS Intimates Rathmalana

- Gained hands-on experience in 3D modeling, Arduino programming, and product development, enhancing skills in DFMA and integrating academic knowledge with real-world engineering challenges.

Education

University of Sri Jayewardenepura *5th Oct 2024 – Present*
MSc in Computer Science (Reading)

- **Coursework:** Data Structures and Algorithms, Computer System Architecture, Computer Graphics and Image Processing, Artificial Intelligence, Machine Learning etc.

University of Peradeniya *Nov 2018 – Dec 2024*
BSc(Hons) in Mechanical Engineering

- GPA: 3.1/4.0 [Second Class Lower Division] (Transcript & Degree Certificate)
- **Coursework:** Digital Design, Engineering Design and Innovation, Differential Equations, Programming Methodology, Control Systems, Embedded Systems, etc.

Dharmaraja College, Kandy *Jan 2009 – Aug 2017*
Secondary Education

- A/L - 2017 (Physical Stream)- Combined Mathematics (A), Physics (A), Chemistry (B) (Results)
- O/L - 2014 - 8A's & 1B (Results)
- Junior Prefect Board (2012), Treasurer of Astronomical Society (2015-2016), Media Coordinator of Science Society (2015 - 2016) (Recommendation Letter)

Ongoing Projects

Sensor Bubble for Vegetable Carrier *March 2024 - Present*

- An IoT project to develop a sensory system with 3D modeling and sensors to monitor environmental conditions of food during transport, aiming to identify and address packaging solutions.

Enhancing RAFT [Recurrent All-Pairs Field Transforms] with Attention-Based Pyramid Networks for Improved Optical Flow Estimation *May 2024 – Present*

- Enhancing RAFT with Attention-Based Pyramid Networks improves optical flow estimation by integrating attention mechanisms and multi-scale processing for more accurate and detailed motion analysis.

Research

Design optimization of Origami-Inspired Airbag for landing and crash protection. *OrigamiAirBag*

- Conducted a literature review on origami-inspired airbag systems, analyzing various folding patterns like Miura Ori, Hexa-Tri, and Huffman Waterbomb for their crash absorption and deployment efficiency, using Python to create SVGs and simulating them with the Origami Simulator, which provided insights into optimizing compact, efficient airbags and advancing vehicle safety technology.
- Tools Used: Python, Origami Simulator

CAN Bus Data Visualization Tool

- Developed a CAN Data Visualization Tool using Arduino boards and sensors to interpret automotive CAN bus data, implementing a two-step process for real-time data visualization on a serial monitor and creating graphical representations with MATLAB, while enhancing skills in data processing and integration.
- Tools Used: MATLAB, Arduino

Projects

Programming FPGA for MPSOC Design

- Quartus II and Nios II software build tools are used to program the FPGA to create basic systems on chips, modify the CPU, and create multiprocessor systems on chips.
- Tools Used: Quartus II, Nios II, FPGA

Game Jumping Jack *Game-JumpingJack*

- The project's main objectives include handling interrupts in the AtMega328P microcontroller, serial connection, saving data in EEP-ROM, and utilizing sensors
- Tools Used: AVR

Design and model of a Carrot Slicer

- Utilized standard techniques and SolidWorks software to design and model the project, incorporating innovative methods inspired by survey findings. This approach allowed for the integration of data-driven insights into the project's development.
- Tools Used: SolidWorks

Skills

Programming: C, Python, MATLAB, HTML, AVR, R

Softwares: Solidworks, Matlab Simulink, Ansys Fluent, Proteus, Adobe Eagle, Autocad, Photoshop, Arduino, MS Project, MS Office

Soft Skills: Time Management, Problem-solving, Documentation, Engaging Presentation, Leadership, Critical thinking & Problem Solving etc.

Certificates

2021 **Lean Management for engineers' white belt course**, Institue of Lean and Green Solutions (PVT) LTD.)
2012 **International Olympiad Training Programme**, The Department of Education of Central Province

Achievements

2023 **Participation**, IESL Student Chapter Cad Eager 3d Modeling Competition
2022 **University Colors**, Hockey *UOP*
2017 **High Distinction**, Sri Lankan Mathematics Olympiad
2016 **High Distinction**, Australian National Chemistry Quiz - Senior Division
2016 **High Distinction**, Sri Lankan Mathematics Olympiad
2014 **High Distinction**, Australian National Chemistry Quiz - Junior Division
2014 **High Distinction**, Sri Lankan Mathematics Olympiad

Volunteering

Foundation Of Astronomical Studies And Explorations (FASE) *Oct 2017 - Present*

- Contributing to the promotion of astronomy through diverse initiatives such as astronomical nights, public lectures, and workshops, and supporting FASE's mission to foster astronomical knowledge among Sri Lankan students and the general public.
- Roles: Member, Editor, Vice President, Advisory Board Member

Rotaract Club, University of Peradeniya *Jun 2019 - Jun 2022*

- Chair of the 'Hanthana Hendewa 20' fundraising project and contributor to the 'Reach For Water' Project, aimed at preventing Chronic Kidney Disease in Sri Lanka's dry zone.
- Roles: Member

Arunella Social Service Project *Jan 2019 - Nov 2023*

- Participated in a project by the Engineering Students Union of the University of Peradeniya aimed at improving underprivileged schools in Sri Lanka, including teaching science and mathematics to O/L students at Vimalarathne Kumaragama Maha Vidyalaya in 2020 and engaging in fundraising efforts in 2023 to support the redevelopment of public restrooms and the restoration of the library roof at Wewathenne Maha Vidyalaya, Gampola.
- Roles: Teacher, Fundraiser

Extra Curricular

2023 **Champions**, Sri Lankan University Games (SLUG) - Hockey *Sri-Lanka*
2022 **University Colors**, Hockey *UOP*
2022 **2nd Runners-Up**, Inter University Games - Hockey *Sri-Lanka*
2019 **University Half-Colors**, Hockey *UOP*
2020 **Runners-UP**, Rajarata 6's Hockey Championship *RUSL*
2019 **2nd Runners-UP**, Mora 9's Hockey Championship *UOM*
2019 **Champions**, Sri Lankan University Games (SLUG) - Hockey *Sri-Lanka*

References

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