Barathraj Manthiramoorthy

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"Engineer and Researcher with strong technical skills, problem-solving abilities, and a solid mathematical background. Passionate about cutting-edge research and innovation. Seeking opportunities in **Robotics and AI or Electronics and Embedded-IOT** to create something special."

Education

University of Moratuwa (uom) 2020 to 2024
Bachelor of Science (Hons) in Electrical Engineering *GPA: 3.45/4.2*

Secondary Education - Jaffna Hindu College 2010 to 2018
Achieved results superior to 99 percent of fellow students island-wide

Primary Education – J/ Periyapulam Maha Vidyalayam 2005 to 2009

Experience

Lecturer | *Department of Electrical and Electronic Engineering, University of Jaffna (uoj)* Nov 2024 - Present
Robotics, Control Systems, Introduction to Electronics and Instrumentation, Electronic Product Design, Electronic Circuits and Devices, Power Electronics, Material Science and Engineering

Instructor | *Department of Electrical and Electronic Engineering, University of Jaffna (uoj)* Aug 2024 - Oct 2024
Robotics, Power Electronics, Power System and Control, Embedded System, Artificial Intelligence

Electronic Engineer | *Power Electronics Lab (R&D), Vega Innovations pvt ltd* Jan 2023 - Jun 2023
Had 6 months of training and Involved in various tasks within the Solar Hybrid Inverter and Motor Controller for EVX projects.

- ESP32 - IOT Connection | *Embedded, rs485, Serial Com, MQTT(mosquitto), HTTP, Nodered, XCTU*
- Inverter Display Project | *Embedded, Code Composer Studio, LCD display, time ISR, Touch display*
- DAB Converter Simulation | *control system, PID tuning, MATLAB, Design*
- Motor Controller Soldering and Testing | *Soldering, Circuit analysis, BOM, Testing*

Projects

Intelligent Beach Cleaning Robot | *Robotics, Embedded Systems, ML, AI, Design, Autonomous, YOLO* 2023
- Development of a prototype intelligent beach cleaning robot with dual-mode refuse collection, autonomous navigation, obstacle avoidance and object detection
- **Contribution:** Designed the refuse collection system using Solid Works, built the prototype robot, implemented embedded system control, and developed autonomous navigation algorithms for efficient beach cleaning

Automatic Power Factor Correction | *Simulation, Proteus-Design, MATLAB, Arduino* 2022
- Designed an automated system to continuously monitor the power factor and adjust the capacitor bank as needed, without human intervention.
- **Contribution:** Designed and simulated the RLC circuit system using Proteus and automated its functionality

Weather Station Project | *Embedded Systems, IOT (ThingSpeak), Arduino, Control Systems* 2021
- Developed a small device using Arduino to monitor environmental parameters (temperature, humidity, air pressure) and upload data to cloud storage.
- **Contribution:** Implemented air quality monitoring with MQ135 module and IoT analytics. Designed wind speed monitoring using a wind turbine and IR speed sensing module.

Visual-Inertial SLAM Systems for Real-Time Navigation in Dynamic Environments on going

- **Ongoing research** on a SLAM system combining visual and inertial data for real-time navigation. It uses sensor fusion and deep learning to detect and filter dynamic objects, enhancing mapping accuracy for mobile robots and UAVs
- **Key Words:** *SLAM, Sensor Fusion, Indoor Navigation, Robotic Localization, Visual-Inertial, Computer Vision, Deep Learning*

Deep Learning for Tactile Understanding from Visual and Haptic Data on going

- **Ongoing research** on integrating visual and haptic data using deep learning to provide real-time tactile feedback for robotic manipulation. The system improves robotic precision and adaptability in dynamic environments, with applications in service, assistive, and warehouse robots
- **Key Words:** *Deep Learning, Tactile Feedback, Visual Data, Haptic Data, Sensor Fusion, Object Recognition*

Development of Underwater Surveillance System for Detecting Divers on going

- **Designing a surveillance system** with sensor fusion and machine learning to detect and classify human divers in real time. The system targets anti-smuggling applications by distinguishing divers from marine life and tracking unauthorized activity in restricted underwater zones
- **Key Words:** *Underwater Surveillance, Sonar System, Object Detection and classification, Data Fusion, Deep Learning*

Development of an EV Drivetrain Design and Prototyping on going

- **In collaboration with an industry**, this project involves drivetrain design, customer analysis, and prototype development to promote EV adoption by addressing local financial and technical challenges
- **Key Words:** *EV Conversion Kit, Electric Drive Train, Electric Motor Motor Controller Design, Power Electronics, Prototyping*

Publications

Eliminating Temporary Power Interruptions: A PLL-based Approach to ATS Implementation for Emergency Supply Systems — The International Conference on Advanced Materials for Clean Energy and Health Applications (AMCEHA 2025).

Intelligent Beach Cleaning Robot with Dual Modes of Refuse Collection and YOLO-based Detection — 4th International Conference on Electrical Engineering (EECon 2024).

Design of Refuse Collection Mechanisms for an Intelligent Beach Cleaning Robot — ERU Symposium 2023, University of Moratuwa.

Skills

Programming Languages: Python, C/C++

Tools: MATLAB, Eagle PCB, ROS, Circuit Maker, Proteus, Wolfram Mathematica, Arduino, Visual Studio Code, LTspice, Blender, Webots, Visual Basic, Code Composer Studio, SolidWorks, PSSE , COMSOL, PSCAD

Memberships

- Memberships – IEEE, Associate Member of IESL, IAARC, SEDS Sri Lanka, All India Council for Technical Skill Development AICTSD)
- Clubs – EESoc, SEDS Mora, Mathematics Society-University of Moratuwa
- Volunteering – IESL JIY (Regional representative 2021), HRM panel member in M-Tutor (2020,2021), "gammedda IEEE We phase 3" for school students (Regional representative 2022)

Interests

- Robotics and Artificial Intelligence
- Autonomous Systems
- Embedded Systems and IOT
- Automation and Control system
- Power Electronics
- Mathematics
- Aerospace

Certifications

- Embedded Systems: Project Development
- Arduino and Programming in Internet of Things
- Application of Sensors in Mechatronics
- Introduction to Embedded Machine Learning
- Machine Learning with Artificial Intelligence
- Introduction to Neural Network
- Basic Industrial Control System Cybersecurity Training Course
- Master PLC Programming
- Siemens PLC Training for Beginners
- Battery Technologies
- Motors and Controllers for Electric Vehicles
- SQL (Basic) - Hacker Rank

Honours and Awards

- IEEE R10 Robotics Competition 2024 Sri Lanka Section - First Place
- Best Paper Award Nomination at ERU Symposium 2023
- International Youth Math Challenge 2023(Silver Honour), 2022(Bronze Honour)
- International Mathematics Competition for under graduates 2022 – Certificate
- International Astronomy and Astrophysics Competition 2022 – up to pre-final round
- Open Mathematical Olympiad for University Students 2022 – Second prize
- μ mora Mathematics Competition 2020 – Certificate
- Mathlete 2020 – university level Mathematics Competition – Second Place
- All Island Mathematics Quiz Competition (Dec 2017) – First Place with Gold metal
- National Mathematics Olympiad Competition (March 2015) – Certificate

References

Prof. A.G. Buddhika P. Jayasekara
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