

NATHAN SHANKAR

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OBJECTIVE:

Highly motivated Electrical and Electronics Engineer with extensive experience in hardware and software projects, aiming to pursue a Master's degree in Electrical and Computer Engineering to learn more about Robotics, Microcontrollers, the Internet of Things (IoT), and Power Electronics, thus facilitating the application of advanced concepts to develop sophisticated prototypes and a high impact factor research profile.

EDUCATION:

B.Tech in Electrical and Electronics, Vellore Institute of Technology, Vellore, Tamil Nadu 2019-2023
CGPA: **9.45/10**

RELEVANT COURSES:

Robotics, Control Systems, Internet of Things, Semiconductor devices and circuits, Analog and Digital circuits, Power system engineering, Power electronics and drives, Microprocessor and microcontrollers, Electric Vehicles, Biomedical Engineering

WORK EXPERIENCE:

Bodhi Labs, Intern (Robotics, IoT, and Automated Test Engineering) December 2022 – April 2023

- Improve the stability and assist with hardware and software changes of the table tennis bot.
- Work on IoT implementation based on the use case.
- Work on soldering, wiring, and testing.

Refining Skills Academy, Educator (Mathematics and Physics) December 2022 - April 2023

- Provide optimal care and academic support for students from grades 6-12.
- Help the pupil to cope with the academic standards and also assist in helping them think outside the box.
- Introduce innovation and help them formulate ideas in areas of STEM.

ACADEMIC PROJECTS:

Electric Cycle, Self February-April 2019

- Worked on converting a household bicycle into hybrid transportation from a broken segway's components.

Vyadh Rover, VIT University June 2020-November 2022

- Team comprised around 20 members from different disciplines of engineering and combined their expertise to design a Mars rover. The team was divided into different sub-teams of management, electrical, science, software, and mechanical.
- I was the primary contributor to the electrical sub-team and my main contribution was designing PCBs and programming the rover's movement.

Autonomous Self-Driven Car using Raspberry Pi and Arduino UNO, Self September - December 2020

- The proposed vehicle is programmed to navigate autonomously by detecting and implementing the following: Lane Edge identification and Centring, Obstacle Detection and maneuvering, Lane End and U-turn, Speed Sign Detection and simultaneous adjustment, Stop Sign Detection, Traffic Light Recognition, Manual Control, and Pedestrian Detection
- The main objective was to be able to identify and minimize accidents by predicting user driving patterns, however, since the project was self-funded it had limited functionalities as listed above.

Heyo Mayo (voice assistant), Self

March-May 2021

- The project's main objective is to pretend to be a real-life Jarvis. It can turn lights connected to RPi ON/OFF. It can tune in to radio stations preset by the user or can play music from YouTube. It has some preset questions to which it will give responses set by the user.
- The project utilizes a mic and a speaker connected to the Raspberry Pi to listen to the user and respond to their queries. It can be considered a cheap alternative to a Google Voice kit.

Intelligent Method for Estimation of SoC, VIT University

June-November 2021

- Worked in a group of four students under the guidance of two faculties to focus on the implementation and performance comparison of a conventional and an intelligent method for estimation of the SoC of a battery.
- I focused mainly on the Kalman Filter and the documentation part of the project and the work was published in 2021 Innovations in Power and Advanced Computing Technologies (i-PACT) and received the best paper award.

Performance Enhancement of Induction motor using Fuzzy Logic Control, VIT university

July-Dec 2021

- In this study, a soft computing approach called Fuzzy Logic is used to regulate the speed of an induction motor to obtain optimum torque with the least amount of loss. The fuzzy logic controller (FLC) is essential in the design of Induction motor control systems since it is an accurate and resilient controller

Health Monitoring System, Self

January – February 2022

- The designed system utilizes various sensors to measure the heart rate, SpO2, ambient skin temperature, body temperature, blood pressure, and muscle movements (in the case of coma patients) and monitor the surrounding conditions as well.
- Apart from the novelty of integrating multiple sensors, the system can also send live video feedback of the patient to a webpage created to keep track of the patient's condition.

Bionic Claw, VIT University

March – May 2022

- The claw can successfully grasp cylindrical and cubical surfaces and research is furthered in the domain of precision grab to emulate a human grasp. 3 modes of control have been integrated along with a wrist movement emulated by a joystick.
- In the 3 modes of control, they are divided between a keypad, a potentiometer (precision control), and autonomous control. The autonomous control utilizes the myo-signals received from the myoware EMG sensor and maps it to an analog value the servo can comprehend and can hence open or close based on the stress that is applied by the user's muscle.

Design and Implementation of a novel compact MLI, VIT University

July 2022-Present

- Research is being done on the design and implementation of a novel multi-level inverter that has an enhanced reliability profile for utility applications. The main issue is when the inverter's output voltage is not sinusoidal, it contains harmonics. These harmonics can be decreased by employing appropriate control strategies.

BMS for Li-ion Batteries Based on Artificial Intelligence, VIT University

Jan 2023 – Present

- We have shown in our work that the state estimation of Li-ion batteries can be precisely predicted using AI methods and comparison between different algorithms is provided as well, which can be combined with a battery management system to improve electric vehicle performance and can thus simplify the existing challenges in the system. This work is currently under submission for ASEJ.

TECHNICAL CERTIFICATIONS & PUBLICATIONS:

- N. Shankar, A. Chitra, D. Banerjee, V. Sharma, K. Zhutshi and W. Razia Sultana, "Performance Comparison of Conventional and Intelligent method of Charge Estimation," 2021 Innovations in Power and Advanced Computing Technologies (i-PACT), 2021, pp. 1-7, doi: 10.1109/i-PACT52855.2021.9697046.

- Shankar, N.; Nallakaruppan, M.K.; Ravindranath, V.; Senthilkumar, M.; Bhagavath, B.P. Smart IoMT Framework for Supporting UAV Systems with AI. Electronics 2023, 12, 86. <https://doi.org/10.3390/electronics12010086>
- Y. Khawaja, N. Shankar, I. Qiqieh, J. Alzubi, O. Alzubi, M. K. Nallakaruppan, and S. Padmanaban, “Battery management solutions for li-ion batteries based on artificial intelligence,” Ain Shams Engineering Journal, p. 102213, Mar. 2023. <https://doi.org/10.1016/j.asej.2023.102213>
- Shankar N, Bhagavath BP, Avinash N, Raju NKK, Subashini MM. An Affordable and Fully Functional Bionic Claw Using Myoelectric Signals for Physically Challenged. Research Square; 2022. DOI: 10.21203/rs.3.rs-2138754/v1 (Preprint Submitted to Journal of Biological Engineering on 10th Nov)
- Forecasting Solar Power Distribution with Explainable AI models – Submitted to IEEE Systems Journal on 13th March 2023.
- Ammonia Based Thermal Exchange Charging System for Hybrid Electric Vehicle – Accepted (Presented on 6th Nov) for NCICEC 2022 (Paper ID: 5899)
- Novel Lane And Object Detection Technique Using Visual Camera – Accepted (3rd Nov), (Presentation on 27th Nov) for iCASIC 2022 (Paper ID: 133)
- “Interfacing with the Raspberry Pi”, Coursera-University of California, Irvine | August 2020
- “How Google does Machine Learning”, Coursera-Google Cloud | August 2020
- “Launching into Machine Learning”, Coursera-Google Cloud | August 2020
- “Technical Support Fundamentals”, Coursera-Google | August 2020
- “The Raspberry Pi Platform and Python Programming for the Raspberry Pi”, Coursera-University of California, Irvine | August 2020
- “Introduction to the Internet of Things and Embedded Systems”, Coursera-University of California, Irvine | November 2020
- “Introduction to TensorFlow”, Coursera-Google Cloud | February 2021
- “Introduction to Programming with MATLAB”, Coursera-Vanderbilt University | February 2021
- “Principles of Management”, Coursera- Johns Hopkins University | August 2022

ACTIVITIES AND AWARDS:

- Best Paper Award for the paper titled “Performance Comparison of Conventional and Intelligent method of Charge Estimation”, i-PACT2021
- Raman Research Award recipient 2023
- Merit Scholarship for Outstanding Performance in academics, AY 2021-22, AY 2022-23
- Volunteered to help educate children for “Anokha NGO”, a non-profit organization working towards empowering the orphaned, February 2020-February 2022
- Director of Projects at IEEE Circuits and Systems, VIT Vellore, March 2021 – January 2022
- Team Manager at Team Vyadh Rover, VIT Vellore, June 2021 – April 2022
- Head of the Projects Division (Executive Staff) at SEDS India, September 2021 – September 2022
- Executive Student Council Member and Program Representative, VIT Vellore, October 2022 - Present
- Qualified for the Finals of the University Rover Challenge, Team Vyadh, 2020
- Top 10 teams worldwide in International Rover Design Challenge, Team Vyadh, 2021
- Additional Learning on Pspice, VIT Vellore, 2020
- IELTS 8.0/9.0, June 2022