Anirudh Upadhyaya

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Education

- **University of Wisconsin-Madison** — Madison, WI
  Masters in Electrical and Computer Engineering; GPA: 3.84 — *Sep 2022 - June 2024 (Expected)*
  Courses: Electromagnetic design of AC machines, Dynamics of AC Machines and Drives, Power Electronic Circuits, Digital System Design
- **Indian Insitute of Technology Madras** — Chennai, India
  B.Tech in Automotive Engineering GPA: 3.45 (8.61/10.0 - Top 10 in class of 55) — *Aug 2013 - May 2018*
  Courses: Control of Automotive Systems, Analog and Digital Electronics, Energy Storage Devices and Systems

Objective

Experienced electrical engineer with expertise in motor controls and 4 years of work experience in the automotive industry seeking full time position for power engineering roles.

Skills Summary

- **Languages**: C++, Python, C, R
- **Tools**: MATLAB, GIT, ETAS INCA, Vector CANalyzer, LaTeX, JMAG, FEMM
- **Protocols**: CAN, SPI, UART, I2C

Experience

- **Seveson Research Group** — Madison, WI
  Research Assistant, Advisor: Eric Severson — *Sep 2022 - Current*
  - **Member**: WEMPEC - Wisconsin Electric Machine and Power Electronics Consortium
  - **Characterization of bearingless machine on bearingless dynamometer**: Conducted experiments, developed scripts to automate and post-process data, and performed engineering analysis to characterize and measure machine constants
  - **Operation of ultra-high speed machines**: Successfully operated and tested a bearingless machine at 60 kRPM. Techniques understood and implemented: *Continuous and discrete-time control, field oriented current regulation, motion control for rotation and levitation.* Responsible for realizing entire test setup and necessary firmware.
  - **Control simulation and verification through MATLAB Simulink**: Developed simulink models to perform Model-in-loop (MIL) simulations, developed custom C code to integrate and test auto-generate embedded C code on custom control board - AMDC
  - **Sensorless operation for high-speed machines**: Developed a novel observer based technique to accurately sense rotor positions at speeds in excess of 150 kRPM. Resulted in a conference paper.
- **Bosch Limited** — Bangalore, India
  Deputy Manager - R&D — *July 2018 - July 2022*
  - **Li-ion Battery Development**: Responsible for system requirements elicitation, system requirements definition, functional integration and functional testing of lithium ion battery pack for two-wheeler application. Defined functional requirements for Battery Management System (BMS) and lead interaction with potential suppliers of BMS
  - **Electric Vehicle Application Engineering**: Studied the interaction of powertrain components of a 1.5-ton electric light commercial vehicle to calibrate the Vehicle Control Unit (VCU) software. Defined test cases and executed on-road fleet validation programme to improve calibration maturity. Analysed fleet data and set up bug tracking mechanism.
  - **Battery Management System (BMS) Developement**: Performed component selection including the Analog Front End (AFE), MOSFET and Gate driver IC for a 4 cell Lithium-ion BMS. Contributed to schematic review of the BMS. Developed firmware in embedded C for an ARM based microcontroller to test basic functionality of the BMS

Publications

1. **Anirudh Upadhyaya**, Aravind M. Nair, Nathan Petersen, Eric Severson "Back-EMF Based Self-Sensing Vector Control for Ultra-High-Speed Surface Mount PMSM" *2023 IEEE Energy Conversion Congress and Exposition (ECCE), Nashville, TN, USA, 2023 (Accepted)*
2. Yettella Siva Prasad Reddy, **Anirudh Upadhyaya**, Vittilapuram Kannan Subramanian "A metric based battery thermal design approach" *2021 IEEE International Transportation Electrification Conference (ITEC-India)*

Socities and Activities

- Student member of IEEE Industry Applications Society (IAS) and Industrial Electronics Society (IES)
- Volunteered as a reviewer for multiple conferences - ITEC 2023, ECCE 2023
- Helped organize STEM outreach programs for middle school youth across Wisconsin