

Vaibhav Shah (Ph.D.)
Ph.D. (IIT Ropar) | MTech (Amrita Vishwa Vidyapeetham) |
B. E. (RGPV, Bhopal)

Hyderabad- 500032

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LinkedIn- <https://www.linkedin.com/in/vaibhav-shah-0b8466154/>

PROFESSIONAL EXPERIENCE

Carrier Corporation- Hyderabad Research and Development (HRDC)

09/2022- Present

- **Lead Engineer – MBD Electrification**
- **Senior Engineer – MBD Electrification**

03/ 2024 – Present

09/ 2022 – 03/2024

Key software's used- MATLAB/Simulink, DYMOLA (Modelica), Python.

EDUCATION

The International Institute of Information Technology (IIIT), Bangalore, India

Executive PG Program in Data Science with Specialization in Deep Learning

07/2023 – Present

Courses Credited-

Liverpool John Moore's University (LJMU), Liverpool, United Kingdom (U.K)

M.Sc. in Data Science

Indian Institute of Technology (IIT), Ropar (Punjab), India

Ph. D. from Department of Electrical Engineering'

Thesis Topic- Control of Integrated Three-level and Multi-level Converter Topologies with Driving and Charging Capabilities for Switched Reluctance Motor Drivetrain Based EV application. CGPA: 7.75/10

(Defense Completed-24/07/2023)

07/2018 – 07/2023

(On campus- 07/2018- 09/2022)

Hardware Developed for Validation:

1. Asymmetric Half-Bridge (AHB) and Multilevel converter with SEMIKRON SKM75GB12T4 switches and SKYPER 32 PRO gate driver for four-phase Switched Reluctance Motor.
2. Interfacing DSP (TMS320-F28379D) and SKYPER 32 PRO using voltage level shifter CD4504.
3. Power suppliers (230 V AC to 5V DC) for current and voltage sensors.
4. Circuit design for Current and Voltage sensors with TL084 operational amplifier.
5. Signal processing circuit for incremental encoder BAUMER-EIL580-T.
6. Single-phase front end power factor correction circuit.
7. Three-phase active front-end rectifier.

Shah, Vaibhav (Ph. D)

8. DC-DC converter- Four Quadrant non isolated DC-DC converter.

Courses Credited- HV Power Equipment, Power Converter Analysis and Design, Design and Application of Electric Drives, Electromechanics.

Amrita Vishwa Vidyapeetham, Coimbatore (Tamil Nadu), India

Master of Technology (with specialization in power electronics), CGPA: 8.52/10

2018

Courses Credited- Linear Algebra and Numerical Methods, Power Converters-I, Electrical Machines Analysis, Modern Control Theory, Digital Signal Processing, Power Converters-II, Electric Drives and Control, Embedded Controllers, Digital Control Systems, FPGA Based system Design, Adaptive Control System, Electric Drives and Control Lab.

SVVV Indore, Affiliated to University of Madhya Pradesh (RGPV), India

Bachelors in engineering (Electronics and Electronics Engineering), CGPA: 6.57/10

2015

High Intermediate Certificate (CBSE)- XII Class

2011

CGPA- 7.26/10

Secondary School Certificate (CBSE)- X Class

2009

CGPA- 8.68/10

U.S PATENT/S [Category -A1] (FILED AS FIRST INVENTOR WITH CARRIER CORPORATION)

Energy Management System for Fuel-Cell-Battery Hybrid System with One DC-DC converter.

Application ID -- 63/599,771

Filing Date- 16/11/2023

An Auxiliary Energy Storage Hybrid Architecture and Management Solution for Cold Start Performance Improvement of Compressor Driven PEMFC.

Application ID --

Filing Date-

AWARDS/RECOGNITION (AT HRDC, CARRIER CORPORATION)

Stallion Award

May 2023

POB Award

November 2023

Milestone Award

November 2023

RESEARCH PUBLICATIONS (DURING Ph.D.)

PEER REVIEWED ACCEPTED AND IN-PRESS IEEE TRANSACTIONS/JOURNALS

1. **V. Shah** and S. Payami, "An Integrated Driving/Charging 4-Phase Switched Reluctance Motor Drive with Reduced Current Sensors for Electric Vehicle Application," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, doi: 10.1109/JESTPE.2021.3120468.
2. **V. Shah** and S. Payami, "Fully Integrated Multi-Level Power Converter for SRM Drive with Charging Capabilities (G2V) for Electric Vehicle Application," in *IEEE Journal of Emerging and Selected Topics in Industrial Electronics*, 2022, doi: 10.1109/JESTIE.2022.3190794.
3. **V. Shah**, G. Kumawat and S. Payami, "Phase Current Reconstruction Technique for 4-Phase Switched Reluctance Generator with Two Current Sensors," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 2022, doi: 10.1109/JESTPE.2022.3217693.
4. **V. Shah** and S. Payami, "Integrated Converter with G2V, V2G, and DC/V2V Charging Capabilities for Switched Reluctance Motor Drive-Train Based EV Application," in *IEEE Transactions on Industry Applications*, doi: 10.1109/TIA.2023.3242636.
5. **V. Shah** and S. Payami, "Switched Reluctance Motor Drive-train with Fully Integrated Battery Charger and Instantaneous Zero Charging Torque for Electric Transportation" in *IEEE Transactions on Electrified Transportation*, doi: 10.1109/TTE.2023.3308893.

PEER REVIEWED CONFERENCES accepted and in-press (DURING Ph.D.)

6. **V. Shah**, M. Alam and S. Payami, "High Torque/Ampere Direct Torque Control of Switched Reluctance Motor Drives," 2019 National Power Electronics Conference (NPEC), 2019, pp. 1-6, doi: 10.1109/NPEC47332.2019.9034777.
7. **V. Shah**, M. Alam and S. Payami, "A Novel Direct Torque Control Scheme for High-Speed Control of Switched Reluctance Motor Using 4-Level Torque Controller," The 10th International Conference on Power Electronics, Machines and Drives (PEMD 2020), 2020, pp. 966-971, doi: 10.1049/icp.2021.0974
8. M. Alam, **V. Shah** and S. Payami, "ONLINE FAULT DIAGNOSIS OF STATIC AND DYNAMIC ECCENTRICITY IN SWITCHED RELUCTANCE MOTORS USING PARKS VECTOR ALGORITHM," The 10th International Conference on Power Electronics, Machines and Drives (PEMD 2020), Online Conference, 2020, pp. 885-889, doi: 10.1049/icp.2021.1055.
9. **V. Shah** and S. Payami, "A Novel Direct Torque Control for 4-Phase Switched Reluctance Motor Considering the Actual Rotor Pole Arc with High Torque/Ampere Ratio," IECON 2020 The 46th Annual Conference of the IEEE Industrial Electronics Society, 2020, pp. 826-831, doi: 10.1109/IECON43393.2020.9254741.
10. **V. Shah** and S. Payami, "A Novel 4-level Converter with Inherent Voltage Boosting for 4-Phase SRM," 2020 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES), 2020, pp. 1-6, doi: 10.1109/PEDES49360.2020.9379535.
11. **V. Shah** and S. Payami, "Integrated Power Converter with G2V and V2G capabilities for 4-Phase SRM Drive Based EV Application," 2021 IEEE 2nd International Conference on Smart Technologies for Power, Energy and Control (STPEC), 2021, pp. 1-6, doi: 10.1109/STPEC52385.2021.9718718.
12. **V. Shah** G. Kumawat and S. Payami, "Integrated Power Converter with G2V, V2G and Direct V2V Capabilities for SRM Drive Based Electric Vehicle Application," 2022 Second International Conference on Power, Control and Computing Technologies (ICPC2T), 2022, pp. 1-6, doi: 10.1109/ICPC2T53885.2022.9776689.
13. **V. Shah**, G. Kumawat and S. Payami, "An Integrated Charger with High Efficiency Over Wide Range of Input Voltage with G2V, V2G, and Direct V2V capabilities for SRM Drive," 2022 IEEE IAS Global Conference on Emerging Technologies (GlobConET), 2022, pp. 12-17, doi: 10.1109/GlobConET53749.2022.9872370.

14. **V. Shah** and S. Payami, "A Multi-Level Converter for SRM Drive Based EV Applications with Auxiliary Load Driving Capability," 2022 IEEE 2nd International Conference on Sustainable Energy and Future Electric Transportation (SeFeT), 2022, pp. 1-6, doi: 10.1109/SeFeT55524.2022.9909185.
15. **V. Shah**, G. Kumawat and S. Payami "Solar Powered Electric Drive-Train With Integrated Bidirectional DC/V2V Fast Charger Incorporating Switched Reluctance Motor" 2022 IEEE GLOBAL CONFERENCE ON COMPUTING, POWER AND COMMUNICATION TECHNOLOGIES (GlobConPT).
16. **V. Shah**, G. Kumawat and S. Payami, "Solar Powered Electric Drive-Train With Integrated Multifunctional Dual Power On-Board Charger Incorporating N-phase SRM," 2022 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES), Jaipur, India, 2022, pp. 1-5, doi: 10.1109/PEDES56012.2022.10080481.
17. G. Kumawat, **V. Shah** and S. Payami, "A Universal-Input On-Board Charger Integrated Converter for SRM Drive Targeting Electric Vehicle Application," 2022 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES), Jaipur, India, 2022, pp. 1-5, doi: 10.1109/PEDES56012.2022.10080831.
18. G. Kumawat, **V. Shah** and S. Payami, "Analytical Method for Optimal Control of Switched Reluctance Generator," 2022 IEEE 10th Power India International Conference (PIICON), New Delhi, India, 2022, pp. 1-6, doi: 10.1109/PIICON56320.2022.10045169.

PEER REVIEWED CONFERENCES (DURING M.TECH)

19. **V. Shah** and A. Vijayakumari, "Field Oriented Control of Surface Mount Permanent Magnet Synchronous Machine with Non Linear Observer for Continuous Rotor Position Estimation," 2018 3rd International Conference for Convergence in Technology (I2CT), Pune, India, 2018, pp. 1-6, doi: 10.1109/I2CT.2018.8529529.
20. **V. Shah** and A. Vijayakumari, "Regression based-programmable optimal controller for induction machine," 2017 International Conference on Technological Advancements in Power and Energy (TAP Energy), Kollam, India, 2017, pp. 1-6, doi: 10.1109/TAPENERGY.2017.8397278.
21. **V. Shah** and K. Prakash N., "FPGA Implementation of Sensorless Field Oriented Current Control of Induction Machine," 2017 IEEE International Conference on Computational Intelligence and Computing Research (ICCIC), Coimbatore, India, 2017, pp. 1-5, doi: 10.1109/ICCIC.2017.8524311.

AWARDS/RECOGNITION (DURING Ph. D, IIT ROPAR)

Two Best Paper Awards from IEEE-IAS STPEC conference, and IEEE-ICPC2T conference.

AWARDS/RECOGNITION (DURING B.E, AND MTECH)

- Zonal Winner (Madhya Pradesh), National Robotics Championship organized by Indian Institute of Technology (IIT) Bombay.
- Team Lead for **ROBOCON INDIA** which is conducted by "DD INDIA" and is an international level Robotics Championship.
- 3rd at VNIT (Visvesvaraya National Institute of Technology), Nagpur Techfest.
- Certificate of Merit by "**SCIENTECH**" in recognition for outstanding performance during Embedded System Training.

INTERNSHIPS/TRAINING

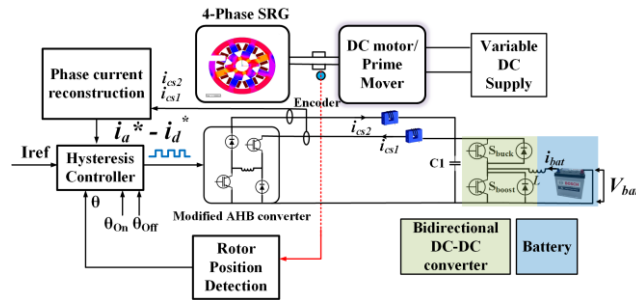
1. **SCIENTECH INDIA**- 4 weeks training on Embedded System

2. **Volvo Eicher Commercial Vehicles-** 3 weeks training on KUKA 6 Axis Robot and Controller KR-4.

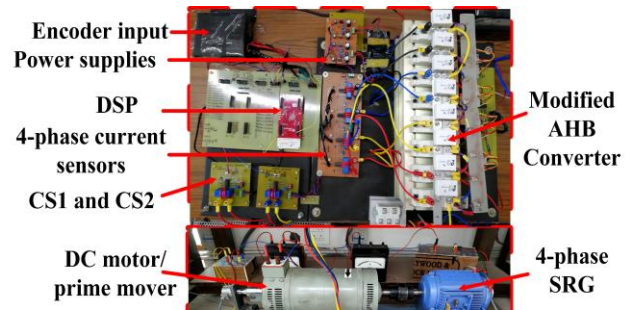
DECLARATION

I hereby declare that all the information furnished in this CV is correct to the best of my knowledge and belief.

PICTURES FOR DEVELOPED HARDWARE (During Ph.D.)



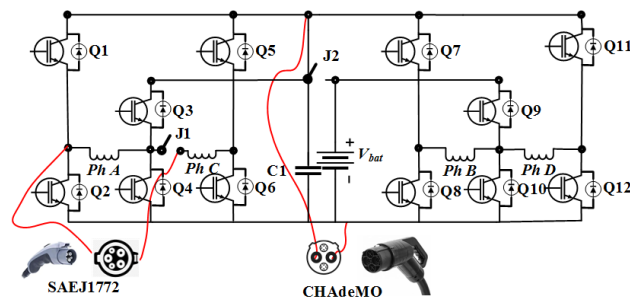
Schematic



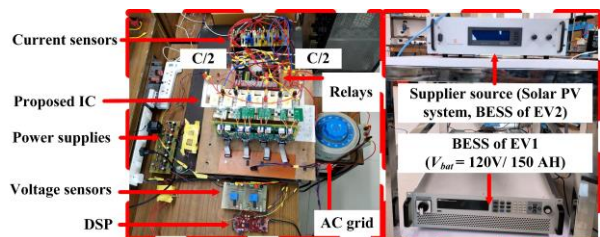
Hardware Setup

For more details please refer-- V. Shah, G. Kumawat and S. Payami, "Phase Current Reconstruction Technique for 4-Phase Switched Reluctance Generator with Two Current Sensors," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 2022, doi: 10.1109/JESTPE.2022.3217693.

Video link-- https://www.youtube.com/watch?v=N0_0Fpa4HOg



Schematic



Hardware Setup

For more details please refer-- V. Shah and S. Payami, "Integrated Converter with G2V, V2G, and DC/V2V Charging Capabilities for Switched Reluctance Motor Drive-Train Based EV Application," in *IEEE Transactions on Industry Applications*, doi: 10.1109/TIA.2023.3242636.