Dr. Puneet Kaur

Professor
Department of Electrical and Electronics Engineering
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Area of Specialization

Power Electronics, Artificial Intelligence (AI) in Electrical Engineering.

Education

Degree	Institute / University	Completed in Year
Ph.D. (Electrical Engineering)	Panjab University, Chandigarh	2013
M.E. (Power Systems)	Punjab Engineering College, Chandigarh (Panjab University)	2004
B.Tech. (Electrical Engineering)	A.I.E.T., Faridkot (P.T.U., Jalandhar)	2001

Professional Experience

Designation	Institute	Period
Professor (EEE Dept.)	University Institute of Engineering and Technology, Panjab University, Chandigarh	Oct 2024 – Present
Associate Professor (EEE Dept.)	University Institute of Engineering and Technology, Panjab University, Chandigarh	Dec 2017 – Oct 2024
Assistant Professor (EEE Dept.)	University Institute of Engineering and Technology, Panjab University, Chandigarh	Oct 2008 – Dec 2017
Lecturer (EEE Dept.)	SSG Panjab University Regional Centre, Hoshiarpur, Punjab	Jul 2006 – Oct 2008
Lecturer (EE Dept.)	Rayat Institute of Engineering & Information Technology, Railmajra, Ropar, Punjab	Jul 2004 – Jul 2006
Lecturer (EE Dept.)	Sri Sukhmani Institute of Engineering and Technology, Dera Bassi, Punjab	Aug 2001 – Sep 2002

Research — Ph.D. Thesis

Topic: *Design and Development of DC Motor Performance Analyser*

Designed and developed **DC Motor Performance Analyser,** a platform capable of calculating losses and efficiency, providing motor characteristics, and acting as a speed controller for a dc motor. The DC Motor Performance Analyser (DCMPA) is an embedded system dedicated to automating the evaluation of any DC motor regardless of its rating and specifications. It has the capability to integrate data collected through electrical loading of dc motor and is able to benchmark motor performance for manufacturers and quality-sensitive users.

Research — M.E. Thesis

Topic: *A Neuro-Fuzzy Approach to Short-term Load Forecasting in a Price-Sensitive Environment*

Developed a software package (PSSTLF) for short-term load forecasting for Punjab State Electricity Board in a price-sensitive environment, using real-time data from State Load Dispatch Center, Patiala. Multi-layer Neural Networks was employed for load forecasting in a price-insensitive model and Fuzzy Logic has been used to convert it into a price-sensitive model.

Technical Achievements/ Research Projects

- **DC Motor Performance Analyser (Ph.D., 2013):** Developed a power-electronics-based universal platform for acquiring all parameters of DC motors, followed by complete analysis. Capable of capturing signatures of various DC motor types with different ratings.
- **Cloud-Connected Vehicle Management System (2016–17):** Provided technical assistance for designed and development of a cloud-connected, retro-fit VMS, for one of leading Rental Car Company of India for tracking and monitoring rental vehicles.
- **IoT-Based Keyless Entry Device (2017–18):** Provided technical assistance to upgrade the existing Vehicle Management System to an IoT-based "Keyless Entry Device" (KLE). It enables remote control and monitoring of automobiles via proprietary communication protocol and other controls like lock/unlock, ignition, door control, and horn etc.
- **Battery Monitor for Electric Vehicles (2019–20):** Worked on consultancy project to develop a solution for monitoring and predicting battery behaviour in electric scooters/e-bikes. Built data capture, processing, cloud transmission, and visualization infrastructure with algorithms for real-time battery state estimation.
- **Battery Test Lab, Panjab University (2022):** Led the establishment of the Battery Test Lab funded under the CSR initiative of Oceaneering International Services Limited (OISL) worth Rs 1 Crore. The Lab is state of art facility developed to support

today's electric mobility market and to enable the industry of the region to test and validate batteries of different capacities, chemistry and associated electronics.

- **AI-Powered Building Management System (2025–26):** Worked on consultancy project on development of Artificial Intelligence (AI)-based query system for integrated building management. The system uses Machine Learning and Large Language Models for intelligent transformation of the acquired data of building into predictive insights, automated diagnostics and a Platform for Conversational Interaction with BMS server in Natural-Language.

Published Research Papers

#	Paper Title	Journal / Conference	Year
1	Fuzzy Logic Module for Short-Term Load Forecasting in Variable Rate Scenario	National Conference on Grand Challenges in Electrical Engineering (GCEE'07)	2007
2	Design and Development of a Multi-Utility Device for Data Acquisition, Monitoring and Control	National Journal of Engineering & Technology Education (NJETE)	2010
3	Development of Scalable Hardware Abstraction Framework for DC Motor Control Applications	International Journal of Electrical and Electronics Engineering Research and Development (IJEEERD)	2011
4	An Automated Technique for Complete Analysis of DC Motors	International Journal of Electrical and Electronics Engineering Research (IJEEER)	2011
5	Computer-based Automated System for Determining the Characteristics of DC Series Motors	International Conference on Advancements in Engineering and Technology	2012
6	Computer-based Automated System for Determining the Characteristics of DC Separately-Excited DC Motors	Journal of International Conference on Electrical Machines and Systems (JICEMS)	2012
7	AVR Microcontroller Based Automated Technique for Analysis of DC Motors	International Journal of Electronics (Taylor & Francis)	2014
8	Computer-based Novel System for Obtaining the Characteristics of DC Shunt Motors	Journal of Electrical Engineering (JEE)	2013
9	An Automated Novel System for Determining the Characteristics, Losses and Efficiency of DC Motors	Journal of Electrical Engineering (JEE)	2013
10	A Novel Framework Based on AVR Microcontroller for Automated Testing and Analysis of DC Motors	IEEE Conference on Recent Advances in Engineering and Computation Sciences (RAECS)	2014

#	Paper Title	Journal / Conference	Year
11	Selective Harmonic Elimination PWM Technique Implementation for a Multilevel Converter	International Journal of Engineering Research	2015
12	Implementation of Selective Harmonic Reduction Approach for Series Cascaded H-Bridge Converters Fed by Unequal DC Voltages	International Journal of Engineering and Technical Research	2015
13	Implementation of Sensor-less Vector Control Technique Based on MRAS Speed Estimator for Parallel Connected Induction Motors	International Journal of Scientific Research and Education	2015
14	Analysis and Design of Single- Phase Single Stage Integrated Converter to Improve Power Factor with Zero Voltage Switching	International Journal of Engineering Research and Technology	2016
15	State of Art of Smart Vehicle Management System Based on PIC Microcontroller and Accelerometer	Journal of Electrical Engineering (JEE)	2016
16	Comparative Analysis of DC-DC Converter Topologies	International Journal of Management, IT & Engineering	2018
17	Ripple Reduction in Bi-directional Multi-Phase Boost Converters: Simulation and Analysis	International Journal of Electrical Engineering and Technology	2018
18	Evaluation of Bidirectional DC-DC Converter Topologies for Enhanced Power Management	International Journal of Management, IT & Engineering	2018
19	Design and Analysis of a GPRS Enabled DALI Master Control Unit	International Journal of Computer Engineering and Technology	2018
20	Simulation and Analysis of a 10-Phase Interleaved DC-DC Converter	International Journal of Electrical Engineering and Technology	2018
21	Data-Driven Energy Optimization for DALI-Based Lighting Control Systems	International Journal of Computer Engineering and Technology	2018
22	An Event-Driven Reactive State-Machine Based C-Programming Framework for Electrical and Electronics Embedded Systems	International Journal of Advanced Research in Engineering and Technology	2019
23	Real-Time Battery Monitoring and Predictive Maintenance for Electric Scooters Using IoT Technology	International Journal of Advanced Research in Engineering and Technology	2019

#	Paper Title	Journal / Conference	Year
24	Battery Ageing Management Using War Optimization in Electric Vehicle Applications	International Journal of System of Systems Engineering (Inderscience)	2024
25	Efficiency Enhancement in a Switched Capacitor Cell Interleaved Buck Converter Using GaN-FETs	International Journal of Power Electronics and Drive Systems (IJPEDS)	2024
26	Optimising the Mechanical Characteristics of Babbit-Ilmenite Composite Through Taguchi Methodology	Industrial Engineering Journal	2024
27	Fusing Nature Inspired Fuzzy Neural Networks for Hypervisor Intrusion Detection	International Journal of Information Technology (BJIT)	2024
28	Secure-RAG: A Natural Language Interface for Linux System Security Analysis Using Retrieval-Augmented Generation	Industrial Engineering Journal	2024
29	SmartBMS-AI: An Advanced Natural Language Interface for Building Management Systems Using Retrieval-Augmented Generation	Industrial Engineering Journal	2024
30	Novel Optimal Region Based Robust Watermarking Using Modified Dragonfly Optimization Algorithm	International Journal of Information Technology (BJIT)	2024
31	Comparative Analysis and Optimisation of Interleaved DC-DC Converters for Fuel Cell Vehicles	International Journal of Engineering Research in Electrical and Electronics Engineering	2024
32	Artificial Intelligence Based Economic Load Dispatch for Power Systems Integrated with Renewable Energy Sources	International Journal of Engineering, Science and Management	2024
33	Evaluating DC-DC Buck Converter Efficiency with MOSFET and GaN FET Technology	Journal of Scientific Research	2025
34	PROCON-AI: A Retrieval Augmented Large Language Model for Intelligent Querying of Industrial Process Control	Industrial Engineering Journal	2025
35	Effective Load Balanced Optimized Task Allocation for Mobile Cloud Computing with Machine Learning Scheme	International Journal of Applied Mathematics	2025

#	Paper Title	Journal / Conference	Year
36	An Integrated IoT-Based Connectivity Control Platform for Remote Keyless Entry and Access Security in Vehicles	IETE Journal of Research (Taylor & Francis)	2026

Book Chapters

#	Chapter Title	Book / Publisher	Year
1	Automated Embedded IoT Framework Development for Electric Scooters	Manufacturing Technologies and Production Systems — CRC Press, Taylor & Francis	2023
2	Development of an ANSI-C Application Layer Framework Designed for the Control of DC Motors	Theory and Applications of Engineering Research, Vol. 8 — BP International	2024
3	Advances in Battery Technology and Power Management System	Technology and Management Practices in Current Era — Willconic Pubisher	2024

Conference Presentations

#	Paper Title	Conference	Year
1	Fuzzy Logic Module for Short-Term Load Forecasting in Variable Rate Scenario	National Conference on Grand Challenges in Electrical Engineering (GCEE'07)	2007
2	Automated Embedded IoT Framework Development for Electric Scooters	International Conference (CRC Press, Taylor & Francis)	2022
3	Comparative Analysis and Optimisation of Interleaved DC-DC Converters for Fuel Cell Vehicles	International Conference on Engineering and Technology (ICET-24)	2024
4	Artificial Intelligence Based Economic Load Dispatch for Power Systems Integrated with Renewable Energy Sources	International Conference on Engineering and Technology (ICET-24)	2024
5	Integration of Fuel Cells with Bidirectional DC-DC Converters for an Optimized Performance for EV	CHASCON-2024—National Conference on Indigenous Technologies for Viksit Bharat	2024
6	AI-Based Prognostics in Power Electronics Converters	CHASCON-2025 — National Conference on Empowering Humanity: Science, Technology and Healthcare for All	2025

#	Paper Title	Conference	Year
7	Advancement Through Hydrogen Storage for Hybrid Off-Grid Renewable Systems	CHASCON-2025 — National Conference on Empowering Humanity: Science, Technology and Healthcare for All	2025

Expert Lectures / Invited Talks

#	Event	Topic	Year
1	WECON 2018, Chitkara University, Punjab	Power Electronics for Energy Efficient Embedded Systems	2018
2	National Seminar on Research Resurgence, Panjab University, Chandigarh	Research Resurgence in Engineering	2020
3	NCASM-2020, CUIET, Chitkara University	Fault Prediction and Analysis in Electrical System	2020
4	ICESS 2023, Chitkara University, Punjab	DC-DC Converters for Embedded Systems	2023

Review Contributions

BP International, IJPEDS, Engineering Research Express, International Journal of Electronics (Taylor & Francis), Journal of Engineering (Wiley), IET Blockchain.

Administrative Roles

- Member of Board of Studies (BOS) of EEE, UIET
- Member of Research Degree Committee (RDC) of EEE.
- Member of Purchase cum Technical Committee of EEE.
- ME (Power Systems) Admission In-charge.

Personal Details

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