MAYANK SAKLANI

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Power systems researcher specializing in active electrical distribution networks, EV integration, and demand-side management. Experienced in optimization algorithms, renewable energy integration, and power control. Skilled in simulation and algorithm development using Python, MATLAB/Simulink, and OpenDSS. Currently pursuing a PhD in Electrical Engineering, focusing on EV charging optimization integrated with renewable energy. Dedicated to advancing smart grid technologies and flexibility solutions through academic-industry collaborations.

Education

University of Petroleum and Energy Studies **2022 – 2025 (Thesis submitted)**
PhD (Electrical Engineering) *Dehradun, India*

Thesis Title: "*Optimisation of Electric Vehicle Charging for Demand Side Management with Distributed Energy Resources*"

DIT University **2020 – 2022**
M.Tech (Power Systems) *Dehradun, India*

Gurukul Kangri University **2015 – 2019**
B. Tech (Electrical Engineering) *Haridwar, India*

Experience

University of Petroleum and Energy Studies, (QS World Ranking - 239) **2022 – Present**
Teaching Assistant, Department of Electrical and Electronics Engineering

- **Electrical Machine lab**: Delivered lectures and tutorials.
- **Microprocessor and Microcontroller**: Facilitated laboratory sessions on programming, interfacing, and applications of microprocessors and microcontrollers; guided undergraduate students on projects and experiments.
- **Basic Electrical and Electronics Lab**: Supervised hands-on experiments emphasizing fundamental concepts of electrical circuits, electronic components, instrumentation, and troubleshooting methods; provided mentoring to undergraduate students.
- Executed event management tasks involving coordination, timetable arrangements, and participant correspondence for the
- **International Conference on Intelligent Communication, Control, and Devices (ICICCD 2023 and 2024)**.
- Supported curriculum and academic event organization under IQAC and co-edited departmental newsletters.

Technical Projects

Ph.D.

1. Optimization of Electric Vehicle Charging for Demand Side Management (DSM)

- Developed **multi-objective EV charging optimization models** integrating renewable energy, DSM constraints, and price-based load shifting.
- Achieved peak-load reduction and improved feeder-level flexibility using dynamic charging coordination strategies.
- Evaluated performance across thousands of EV profiles under **stochastic renewable generation**, ensuring grid stability during uncertainty.

2. Renewable Energy Integration in Active Distribution Networks

- Modeled LV/MV networks with **PV, BESS, and EV clusters** using MATLAB/Simulink, and ETAP.
- Conducted feeder-level analysis to quantify voltage deviations, reverse power flow, and congestion under varying RE penetration.
- Designed an optimization-based **DER scheduling framework** improving hosting capacity and maintaining voltage compliance.

3. HDBSCAN–LP Based Clustering for Real-Time EV Load Management

- Built a scalable EV load management architecture using **HDBSCAN clustering** to classify charging behavior in real-time.
- Formulated a reduced-complexity **Linear Programming (LP)** optimization for cluster-level load balancing.

4. MDP-Enhanced Stochastic Charging Optimization

- Proposed a **Markov Decision Process (MDP)** framework for uncertainty-based charging control under variable

renewable availability.

- Designed stochastic state-transition models for SOC prediction, load uncertainty, and dynamic price conditions.

M.Tech.

1. Load Frequency Control (LFC) of Two-Area Power System Using ANFIS

- Designed an **Adaptive Neuro-Fuzzy Inference System (ANFIS)** controller for multi-area LFC in MATLAB/Simulink.
- Achieved improved dynamic response, reduced overshoot, and enhanced frequency stability.
- Published results in **IEEE ICEPE 2023 (Shillong)** and related IEEE conferences.

2. Optimization for Power System Stability

- Implemented optimization-based LFC improvements using advanced heuristic algorithms such as **HBA and AOA**.
- Analyzed controller performance under varying load disturbances and tie-line power oscillations.

Publications

Journal Publications

1. Saklani M, Saini D.K., Yadav M., Gupta Y.C. *Navigating the challenges of EV integration and demand-side management for India's sustainable EV growth.* IEEE Access, 2024 Sep 30.
2. Saklani M, Saini D.K. *Strategic Pricing and Load Optimization for Effective Demand Side Management in Electric Vehicles Integrated Grid. Process Integration and Optimization for Sustainability*, 2025.
3. Saklani M, Saini D.K., Yadav M., Siano P. *Scalable Data-Driven EV Charging Optimization Using HDBSCAN-LP for Real-Time Pricing Load Management. Smart Cities*, 2025.
4. Ahamad N., Chetri A., Saklani M., Bajaj M., Kotb H., Khan B., Sikander A. *A graphical technique of controller design and selection of lower and upper bounds in controller design using optimization techniques. IET Control Theory & Applications*, 2023.
5. Singh A., Yadav B.P., Saklani M. *Machine learning and RSM-CCD analysis of sustainable concrete using pine cone waste. Asian Journal of Civil Engineering*, 2025.
6. Saklani M, Saini D.K., Yadav M. *Developing Optimized Electric Vehicle Charging Strategies Using MDP-Enhanced Stochastic Models for Peak Load Management. Energy Systems (Springer) – (Under Review).*
7. *Optimization Framework for Multi-Objective Active Distribution System Design with EV Flexibility and Renewable Integration* – To be submitted to *IEEE Transactions on Transportation Electrification* **(Under preparation)** (based on Objective 2 & 3 of PhD work).

Conference Publications

1. Saklani M., Saini D.K. *Spatial Analysis and Clustering of Electric Vehicle Density for Charging Infrastructure Planning.* IEEE CERA 2023, Roorkee.
2. Saklani M., A. Chhetri, D.K. Saini, M. Yadav, Y.C. Gupta. *Load Frequency Control of Two-Area Power Systems Using Optimised ANFIS Controller.* IEEE ICEPE 2023, Shillong.
3. A. Chhetri, M. Saklani, D.K. Saini, M. Yadav, Y.C. Gupta. *EV Battery SOC Estimation Using Extended Kalman Filter and Heuristic Algorithms.* ICMAME 2023, Dubai.
4. Saklani M., N. Ahamad, A. Chhetri, S. Singh. *Load Frequency Control of Power System Using Honey Badger Algorithm.* IEEE ICETET 2022.
5. Saklani M., N. Ahamad, A. Chhetri, S. Singh. *New Control Strategy for LFC Using Archimedes Optimization Algorithm.* IEEE ICETET 2022.

Book Chapter

1. Chhetri, A., Ahamad, N., Saklani, M. Review on Controlling of BLDC Motor via Optimization Techniques for Renewable Energy Applications. In Sustainable Energy Solutions with AI, Blockchain, and IoT, CRC Press, 2024.

Professional Training

1. STTP: Control and Protection of Distributed Networks with High Renewable Penetration – IIT Roorkee.
2. FDP: AI ML using MATLAB for Renewable Energy Applications.
3. Workshop: Electrical Engineering Solutions for Smart Cities: Integration, Innovation, and Impact.
4. Course: Data Analytics and IoT-based Smart Grid Infrastructure.
5. Workshop: Academic Writing and Effective Research Communication.

Technical skills

- **Power Distribution Systems:** Modeling, simulation, and optimization of LV/MV networks with renewable and EV integration.
- **Optimization & Control:** Mixed-integer, nonlinear, and heuristic optimization, adaptive control, and DSM formulation.
- **Programming & Tools:** Python (Pyomo, Pandas, NumPy), MATLAB/Simulink, ETAP, OpenDSS, C/C++, Git.
- **Data Analytics & ML:** Clustering (HDBSCAN), forecasting, data-driven scheduling, and statistical modeling.
- **Research Communication:** Technical writing, presentations, and interdisciplinary collaboration.

Research Interests

- Active flexible low-voltage distribution networks
- Optimization-based siting, sizing, and scheduling of active devices
- Electric Vehicle (EV) charging coordination and renewable integration
- Python-based open-source power system design tools

Languages

English: Advanced Reading, Writing and Speaking

Hindi: Native Language

References

Dr. Devender Kumar Saini,Professor
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