

Dr. Avinash Kumar, Assistant Professor, Electrical Engineering, Indian Institute of Technology, Roorkee, India

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Professional Experience

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| March 2024 ···· Till | ■ Assistant Professor, Indian Institute of Technology, Roorkee |
| June. 2023 ···· March 2024 | ■ Postdoctoral Associate/Research Faculty, Virginia Tech, Advanced Research Institute, Advisor: Prof. Saifur Rahman |
| Jan. 2022 ···· June 2023 | ■ Postdoctoral Research Associate, University of Massachusetts, Lowell
Advisor: Prof. Yuzhang Lin. |
| Oct. 2021 ···· Jan 2022 | ■ Project Scientist, Indian Institute of Technology, Kanpur, India
Advisor: Prof. Abheejeet Mohapatra, |

Research Areas

- Renewable Energy Source (RES) integration, control, protection and stability in microgrid
- Dynamic State Estimator under Measurement and Control Uncertainties
- Cyber-Physical Resiliency for Smart Microgrid
- Grid outage management and control in networked microgrid
- Digital Twins for Microgrid Cybersecurity
- Real-time validation of controller hardware in loop with Real Time Digital Simulator (RTDS).

Education

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| 2015 – 2021 | ■ Ph.D., Indian Institute of Technology, Kanpur, India in Electrical Engineering, GPA: 8.15/10.
Thesis title: <i>Improved Islanding Detection of Inverter Interfaced Distributed Generators in Microgrid.</i>
Advisors: Prof. Abheejeet Mohapatra, & Prof. S. N. Singh, |
| 2013 – 2015 | ■ M.Tech., Motilal Nehru National Institute of Technology, Prayagraj in Power System Engineering, GPA: 9.4/10.
Thesis title: <i>Classification of Inter-Area Disturbance in Power System.</i>
Advisor: Prof. Nand Kishor, |
| 2009 – 2013 | ■ B.Tech., Maulana Abul Kalam Azad University Of Technology, West Bengal, Kolkata in Electrical Engineering, GPA: 8.35/10. |

Invited Talks/Lectures

- Delivered tutorial on Distribution System Monitoring in the Presence of Renewable Energy Sources
Date on Monday, 19 February 2024 in IEEE ISGT North America, 2024

Research Publications: Journals (11), Conferences (10)

Journal Articles: 11

- 1 Huang, H., Lin, Y., Lu, X., Zhao, Y., & Kumar, A. (-). Dynamic state estimation for inverter-based resources: A control-physics dual estimation framework. *IEEE Transactions on Power Systems*, 1–12. [doi:10.1109/TPWRS.2024.3362701](https://doi.org/10.1109/TPWRS.2024.3362701)
- 2 Kumar, A., Mohapatra, A., & Singh, S. N. (-). Sequence measurement-based islanding detection of dgs in microgrid with enhanced power quality. *IEEE Transactions on Instrumentation and Measurement*, 70, 1–11. [doi:10.1109/TIM.2021.3102688](https://doi.org/10.1109/TIM.2021.3102688)
- 3 Kumar, A., Mohapatra, A., Singh, S. N., & Panda, R. K. (-). Space vector rotation based controlled decaying current injection for islanding detection of inverter-interfaced dg. *IEEE Transactions on Smart Grid*, 1–1. [doi:10.1109/TSG.2022.3181422](https://doi.org/10.1109/TSG.2022.3181422)
- 4 Kumar, B. R., & Kumar, A. (-). Mitigation of the dc offset by a sub-cycle sample method m-class pmus. *IEEE Transactions on Power Delivery*, 34(2), 780–783. [doi:10.1109/TPWRD.2019.2892600](https://doi.org/10.1109/TPWRD.2019.2892600)
- 5 Kumar, A., Mohapatra, A., & Singh, S. N. (n.d.). Phaselet-based limited-time q -axis dc offset voltage injection for detection of islanding of dg and fault in a meshed microgrid. *IEEE Systems Journal*, 16(1), 1379–1390. [doi:10.1109/JSYST.2021.3068397](https://doi.org/10.1109/JSYST.2021.3068397)
- 6 Soni, A. K., Kumar, A., Panda, R. K., Mohapatra, A., & Singh, S. N. (n.d.). Adaptive coordination of relays in ac microgrid considering operational and topological changes. *IEEE Systems Journal*, 1–12. [doi:10.1109/JSYST.2022.3227311](https://doi.org/10.1109/JSYST.2022.3227311)
- 7 Ravi Kumar, B., Mohapatra, A., Chakrabarti, S., & Kumar, A. (2023). High-speed sub-cycle algorithm for estimation of decaying dc component in current measurements. *International Journal of Electrical Power & Energy Systems*, 151, 109139. [doi:https://doi.org/10.1016/j.ijepes.2023.109139](https://doi.org/10.1016/j.ijepes.2023.109139)
- 8 Yadav, S., Kishor, N., Purwar, S., Chakrabarti, S., Raussi, P., & Kumar, A. (2023). Real-time implementation for vulnerability of power components under switching attack based on sliding mode. *IET Cyber-Physical Systems: Theory & Applications*. [doi:https://doi.org/10.1049/cps2.12084](https://doi.org/10.1049/cps2.12084)
- 9 Kumar, A., Panda, R., Mohapatra, A., Singh, S., & Srivastava, S. (2021). Mode of oscillation based islanding detection of inverter interfaced dg using esprit. *Electric Power Systems Research*, 200, 107479. Retrieved from <https://doi.org/10.1016/j.epsr.2021.107479>
- 10 Kumar, B. R., Mohapatra, A., Chakrabarti, S., & Kumar, A. (2021). Phase angle-based fault detection and classification for protection of transmission lines. *International Journal of Electrical Power & Energy Systems*, 133, 107258. Retrieved from <https://doi.org/10.1016/j.ijepes.2021.107258>
- 11 Negi, S. S., Kishor, N., Kumar, A., & Uhlen, K. (2017). Signal processing for tfr of synchro-phasor data. *IET Generation, Transmission & Distribution*, 11(16), 3881–3891. Retrieved from <https://doi.org/10.1049/iet-gtd.2015.1566>

Conference Proceedings: 10

- 1 Kumar, A., Lin, Y., Huang, H., Lu, X., & Zhao, Y. (2023). Dynamic state estimation based cyber attack detection for inverter-based resources. In *2023 IEEE Power & Energy Society General Meeting (PESGM)* (pp. 1–5). [doi:10.1109/PESGM52003.2023.10252357](https://doi.org/10.1109/PESGM52003.2023.10252357)
- 2 Kumar, A., Lin, Y., & Lu, X. (2023). Identification of power islands via event-triggered decaying current injection by inverter networks. In *2023 IEEE Power & Energy Society General Meeting (PESGM)* (pp. 1–5). [doi:10.1109/PESGM52003.2023.10253294](https://doi.org/10.1109/PESGM52003.2023.10253294)
- 3 Soni, A. K., & Kumar, A. (2022). Impact of control parameters on short-circuit capacity of inverter based sources. In *IEEE IAS global conference on emerging technologies (GlobConET)* (pp. 1–5). [doi:10.1109/GlobConET53749.2022.9872458](https://doi.org/10.1109/GlobConET53749.2022.9872458)

- 4 Garg, G., Mohapatra, A., Chakrabarti, S., Kumar, A., & Panda, R. K. (2020). Optimal day-ahead load scheduling for voltage and frequency regulation in an islanded microgrid. In *2020 IEEE Power & Energy Society General Meeting (PESGM)* (pp. 1–5). doi:10.1109/PESGM41954.2020.9281686
- 5 Kumar, A., Mohapatra, A., & Singh, S. N. (2020). Improved detection time and performance of frequency relay for islanding detection of dg. In *2020 21st National Power Systems Conference (NPSC)* (pp. 1–6). doi:10.1109/NPSC49263.2020.9331854
- 6 Kumar, A., Panda, R. K., Mohapatra, A., & Singh, S. N. (2020). Lissajous parameters based islanding detection of multiple dgs in microgrid. In *2020 IEEE Power & Energy Society General Meeting (PESGM)* (pp. 1–5). doi:10.1109/PESGM41954.2020.9281787
- 7 Bharadhwaj, H., Kumar, A., & Mohapatra, A. (2019). A synchro-phasor assisted optimal features based scheme for fault detection and classification. In *2019 International Joint Conference on Neural Networks (IJCNN)* (pp. 1–8). doi:10.1109/IJCNN.2019.8852371
- 8 Kumar, A., Kumar, B. R., Panda, R. K., Mohapatra, A., & Singh, S. N. (2019). Phaselet approach for islanding detection in active distribution networks. In *2019 IEEE Power & Energy Society General Meeting (PESGM)* (pp. 1–5). doi:10.1109/PESGM40551.2019.8973438
- 9 Kumar, A., Kumar, B. R., Mohapatra, A., & Singh, S. N. (2018). High speed differential protection of series-shunt compensated transmission line using phaselet. In *2018 15th IEEE India Council International Conference (INDICON)* (pp. 1–6). doi:10.1109/INDICON45594.2018.8987173
- 10 Kumar, A., Negi, S. S., Kishor, N., & Uhlen, K. (2016). Signal processing and classification of synchro-phasor data. In *2016 18th Mediterranean Electrotechnical Conference (MELECON)* (pp. 1–6). doi:10.1109/MELCON.2016.7495339

Books Chapter

- 1 *Simulation tools for power systems applications.* (2022). Elsevier Encyclopedia of Electrical and Electronic Power Engineering in the Smart Power Engineering Section.

Skills

Languages	Strong reading, writing and speaking competencies for English.
Coding	MATLAB, C, LaTeX, ...
Software Tools	MATLAB, PSCAD, RSCAD, PSS/E, CCS
Real Time simulator	RTDS, OPAL-RT, Typhoon
Digital Controller	F28335
PMU Integration	SEL, Orbiter
Misc.	Academic research, teaching, and training

Miscellaneous Experience

Awards and Achievements

- 2019 **Smart India Hackathon Award**, "To locate the fault in distribution network for ad-hoc maintenance" given by ABB GIS Pvt. Ltd.
- 2016 **POSOCO Power System Award**.
- 2005 **Amul Shakti Vidya Shree Award**, 1st Position in 10th School.

Miscellaneous Experience (continued)

Certification

- 2019  A workshop on **Real Time Digital Simulator (RTDS)** for Power Engineering Research and Application (PERA).

Professional Experience

-  Member of IEEE and Power & Energy Society (PES).
-  Ex-Vice Chair of IEEE PES Student Branch Chapter, IIT Kanpur
-  Reviewer for IEEE Transactions on Power Delivery, IET Generation, Transmission and Distribution, Electric Power Systems Research (Elsevier), IEEE Systems Journal, IEEE PES General Meeting and several international and national level conferences.

References

Prof. Saifur Rahman,

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