

Dr. Pankaj Verma

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Google Scholar Link:

https://scholar.google.co.in/citations?user=NLxq9_UAAAAJ&hl=en&authuser=1



Date of Birth: 08 Jan 1985 **Sex:** Male

RESEARCH INTERESTS

Wireless Communication, Cognitive Radio, Spectrum Sensing, Optical Communication, Photonics Crystal Fiber Sensors, Applications of Machine Learning/Deep Learning in Wireless Communications

ACADEMIC RECORDS

Sr. No.	Degree	Institute/University/Board	Year of Passing	Percentage of Marks/CGPA
1.	Ph. D	National Institute of Technology Kurukshetra	2017	8.5 (Course Work)
2.	M. Tech	Delhi Technological University, Delhi	2011	8.01
3.	AMIETE	Institute of Electronics and Telecommunication Engineering	2009	73.26
4.	12 th	CBSE	2002	78.4
5.	10 th	CBSE	2000	79.6

PH. D THESIS TITLE:

Study of Spectrum Sensing Techniques for Cognitive Radio Systems

TEACHING, RESEARCH AND INDUSTRIAL EXPERIENCE

1. Assistant Professor (Feb 2013 to till date)

Electronics and Communication Engineering Department, National Institute of Technology, Kurukshetra, Haryana, 136119, India

2. Research Associate (Feb 2012 to Feb 2013)

Evalueserve SEZ (Gurgaon) Private Limited

Key Responsibilities: Prior art search, Patentability search, White space analysis

3. Assistant Professor (July 2011 to Jan 2012)

Electronics and Communication Engineering Department, Ganpati Institute of Technology and Management, Bilaspur, Yamunanagar, Haryana, India

THESIS SUPERVISED

Phd: 02 completed

M Tech: 14 Completed, 06 Ongoing

ADMINISTRATIVE RESPONSIBILITIES

- Faculty-in-Charge, Institute Table Tennis Team (Jun 2019 to till date)
- Faculty-in-Charge, PG Club (Oct 2020 to July 2022)
- Hostel Warden (Dec 2014 to Jun 2019) and (July 2021 to Jul 2024)
- Faculty-in-Charge, Institute Basketball Team (Jul 2014 to May 2017)

SUBJECTS TAUGHT

- Optical Fiber Communication
- Wireless Communication
- Control Systems
- Semiconductor Devices and Applications
- Basic Electronics
- Circuit Theory

MEMBERSHIP OF PROFESSIONAL BODIES

- IEEE Senior Member, Membership Number: 93797623
- Lifetime member of IETE, Membership Number: AM176655

CONFERENCE ORGANIZED

1. Conference Chair in "**4th International Conference on Machine Learning and Big Data Analytics (ICMLBDA) 2024**" held during 09-11, May 2024, NIT Kurukshetra.
2. Conference Chair in "**2nd International Conference on Advances in Data Computing, Communication and Security (I3CS) 2023**" held during 01-03 June, 2023, NIT Kurukshetra.
3. Conference Secretary in "**International Conference on Advances in Data Computing, Communication And Security**" held during 08-10, Sep 2021, NIT Kurukshetra
4. Conference Chair in "**International Conference on Cutting-Edge Technologies in Computing and Communication Engineering**" held during 06-07, Nov 2020, NIT Kurukshetra.

BOOKS EDITED

1. Editors: Brahmjit Singh, Carlos A. Coello Coello, Poonam Jindal, **Pankaj Verma**, "Intelligent Computing and Communication Systems", Algorithms for Intelligent Systems, Springer, 2021.

2. Editors: **Pankaj Verma**, Chhagan Charan, Xavier Fernando, Subramaniam Ganesan, “Advances in Data Computing, Communication and Security”, Lecture Notes on Data Engineering and Communications Technologies, Springer, 2022.

SHORT TERM COURSES ORGANIZED

1. Course Coordinator in Short Term Course titled “**Industrial Instrumentation and Automation (IIA 2024)**” organized by Siemens Center of Excellence in Collaboration with the Department of Electronics & Communication Engineering, NIT Kurukshetra ECE Dept, NIT Kurukshetra during 06-10 May, 2024.
2. Course Coordinator in Short Term Course titled “**5G/ 6G WIRELESS TECHNOLOGIES (WT-2024)**” organized by ECE Dept, NIT Kurukshetra during 17-21 Apr. 2024.
3. Course Coordinator in Short Term Course titled “**Research Methodologies and Scientific Research Writing using LaTeX (RMSRL-2024)**” organized by ECE Dept, NIT Kurukshetra during 04-08 Jan. 2024.
4. Course Co-coordinator in Short Term Course on ‘**5G Wireless Communication Networks: Fundamental and Implementation Issues**’ held from Jul. 10-15, 2017, organized by ECE Department, NIT Kurukshetra
5. Course Co-coordinator in Short Term Course on “**Cognitive Radio: Fundamentals and Implementation Issues**” held from Jul. 09-12, 2014, organized by ECE Department and Center of Computing and Networking, NIT Kurukshetra

SHORT TERM COURSES ATTENDED

1. ‘**Cognitive Radio: A New Paradigm in Wireless**’ held on Oct. 20-22, 2013 at IIT Kanpur.
2. ‘**Convex Optimization for Wireless Communications**’ held on Sep. 15-17, 2014 at IIT Kanpur.
3. ‘**Detection Theory for Communications and Signal Processing**’ held on Apr. 27-29, 2015 at IIT Kanpur.
4. ‘**Telecom Management: Current & Emerging**’ held from 20/08/2015 to 21/08/2015, 2015 at IIT Delhi

AWARDS/PRIZES

- Best paper award for the paper titled “Weighted Fusion Scheme for Cooperative Spectrum Sensing” in International Conference on Industry 4.0 Technology (I4Tech), Pune, India, pp. 186-190, 2020.
- Gold Medalist in AMIETE

EXPERT LECTURES DELIVERED

1. Served as a resource person in SERB sponsored one week workshop on ‘**Internet of Things and Artificial Intelligence: Emerging Trends, Tools and Techniques**’ during 22-26 Apr, organized by School of Computing, IIIT, Una, Himachal Pradesh

- Delivered an expert talk on 25 Apr 2024 '**Hands on Basic ML Technologies and its Appliaitions**' in one week STC on '**Advancement in Antenna and Wireless Technologies**' during 22-26 Apr 2024 organized by ECE Department, NITTTR, Chandigarh
- Delivered an expert talk in STC on '**5G/6G Wireless Technologies**' during 17-21 April 2024, organized by ECE Department, NIT Kurukshetra.
- Delivered an expert lecture on '**Cognitive Radio for Internet of Things**' in one week STC on Machine Learning and Internet of Things (MLIoT-2019) sponsored by TEQIP-III from 26-02-2019 to 02-03-2019 organized by GEC, Bharatpur
- Delivered an expert lecture on '**Energy Detection based Spectrum Sensing for Cognitive Radios**' in STC on '5G Wireless Communication Networks: Fundamental and Implementation Issues' from 10/07/2017 to 15/07/2017, organized by ECE Department, NIT Kurukshetra
- Delivered an expert lecture on '**Energy Detection based Spectrum Sensing for Cognitive Radios**' in STC on 'Modeling and Simulation of Wireless Communication Systems' from 20/06/2016 to 24/06/2016, organized by ECE Department, NIT, Kurukshetra

REVIEWER

- IEEE Sensors Journal
- International Journal of Swarm Intelligence, Inderscience Publishers Ltd.
- Telecommunication Systems, Springer
- Wireless Networks, Springer
- Defense Science Journal, DRDO, India
- And many more

RESEARCH PROJECTS

Sr. No	Title	Amount	Sponsoring Agency	Status
1	Development of a deep learning enabled algorithm for automatic modulation recognition in blind RF environment (working as Co-PI)	19.38 lakhs	ISRO	Ongoing (2022-2024)

RESEARCH PUBLICATIONS

International Journals

- A Tailor, M Dua, **P Verma**, "Automatic classification of multi-carrier modulation signal using STFT spectrogram and deep CNN", Physica Scripta, Vol 99, no.7, 2024.
- A. Kamboj, P. Jindal, **P. Verma**, "A multi-agent deep Q-learning-based joint relay and jammer selection in dual-hop wireless networks", Annals of Telecommunications, Springer, vol. 80, pp. 251-263, 2024.
- A. Kamboj, P. Jindal, **P. Verma**, "Reinforcement learning-based secure joint relay and jammer selection in dual-hop wireless networks", The Journal of Supercomputing, Springer, vol. 80, pp 2660–2680, 2024. <https://doi.org/10.1007/s11227-023-05575-8>
- A. Kumar, **P. Verma**, P. Jindal, "Machine Learning Approach to Surface Plasmon Resonance Sensor based on MXene coated PCF for Malaria Disease Detection in RBCs", Optik, Elsevier, vol. 274, March 2023.

5. A. Kumar, **P. Verma**, P. Jindal, "Surface plasmon resonance sensor based on MXene coated PCF for detecting the cancer cells with machine learning approach", *Microelectronic Engineering*, Elsevier, vol. 267-268, Jan 2023.
6. A. Kumar, **P. Verma**, P. Jindal, "Surface plasmon resonance biosensor based on a D-shaped photonic crystal fiber using Ti3C2Tx MXene material", *Optical Materials*, Elsevier, vol. 128, Jun 2022.
7. A. Kumar, **P. Verma**, P. Jindal, "Refractive index sensor for sensing high refractive index bioliquids at the THz frequency," *J. Opt. Soc. Am. B*, vol. 38, 12, pp. F81-F89, 2021.
8. A. Kamboj, P. Jindal, **P. Verma**, "Machine learning-based physical layer security: techniques, open challenges, and applications", *Wireless Networks*, vol 27, pp. 5351–5383, Nov 2021.
9. A. Kamboj, P. Jindal, **P. Verma** "Intelligent Physical Layer Secure Relay Selection for Wireless Cooperative Networks with Multiple Eavesdroppers", *Wireless Personal Communications*, vol. 120, pp. 2449–2472, Apr 2021.
10. A. Kumar, **P. Verma**, P. Jindal, "Decagonal solid core PCF based refractive index sensor for blood cells detection in terahertz regime", *Optical and Quantum Electronics*, vol. 53, 165, April 2021.
11. **P. Verma**, "Adaptive Threshold Based Energy Detection over Rayleigh Fading Channel", *Wireless Personal Communication*, vol. 113, pp. 299-311, Jan 2020.
12. **P. Verma** and B. Singh, "Joint optimization of sensing duration and detection threshold for maximizing the spectrum utilization", *Digital Signal Processing*, Elsevier, pp. 94-101, Vol. 74, 2018.
13. **P. Verma** and B. Singh, "On the decision fusion for cooperative spectrum sensing in cognitive radio networks," *Wireless Networks*, Springer pp. 1-10, Vol. 23, 4, 2017.
14. S. S. Chauhan, **P. Verma**, M. Mathur, M. Agarwal and T. Gupta, "Physical layer security of MIMO STBC over Rayleigh fading channels in the presence of channel estimation error", *Optik-International Journal for Light and Electron Optics*, Vol. 127, no. 19, pp. 7625–7630, Oct. 2016.
15. **P. Verma** and B. Singh, "Overcoming sensing failure problem in double threshold based cooperative spectrum sensing", *Optik-International Journal for Light and Electron Optics*, Vol. 127, no. 10, pp. 4200–4204, May 2016.
16. **P. Verma** and B. Singh, "Throughput maximization by alternative use of single and double thresholds based energy detection method", *Optik-International Journal for Light and Electron Optics*, Vol. 127, no. 4, pp. 1635–1638, Feb. 2016.
17. **P. Verma** and B. Singh, "Threshold Optimization in Energy Detection Scheme for Maximizing the Spectrum Utilization" *Procedia Computer Science*, vol. 93, pp.191-198, 2016.

Book Chapters

1. **P. Verma**, P. Jindal, B. Singh, "Sensing Techniques in Cognitive Radio Networks: An Appraisal", *Advanced Wireless Sensing Techniques for 5G Networks*, Chapman and Hall/CRC pp. 57-72, 2018

Conferences

1. B. Singh, Abhinav, P. Jindal, **P. Verma** and C. Prakash, "An Efficient Automatic Modulation Classifier based on VGG Net Model," 2024 IEEE International Conference on

- Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI), Gwalior, India, 2024, pp. 1-5, doi: 10.1109/IATMSI60426.2024.10503017.
2. J. Ramola, R. Arya, M. Parmar, K. Rawat, R. Prakash and **P. Verma**, "Feature Extraction and Scalability: Custom VGG Inspired Neural Network for Multiclass Stress Detection," 2024 First International Conference for Women in Computing (InCoWoCo), Pune, India, 2024, pp. 1-6, doi: 10.1109/InCoWoCo64194.2024.10863267.
 3. J. Ramola, G. Dobriyal, R. Prakash, A. Ahmad, **P. Verma** and V. Upadhyaya, "Automated Face Mask Detection: A Comparative Deep Learning Analysis," 2024 International Conference on Cybernation and Computation (CYBERCOM), Dehradun, India, 2024, pp. 231-235, doi: 10.1109/CYBERCOM63683.2024.10803265.
 4. **P. Verma** and A. Kumar, "D-Shaped Optical Fibre -based SPR Sensor for Environment Pollutants Detection," 2023 International Conference on System, Computation, Automation and Networking (ICSCAN), PUDUCHERRY, India, 2023, pp. 1-4, doi: 10.1109/ICSCAN58655.2023.10395197.
 5. **P. Verma**, "Sensing-Spectrum Utilization Tradeoff for Cognitive Radio Sensors," 2023 IEEE Radio and Antenna Days of the Indian Ocean (RADIO), Balaclava, Mauritius, 2023, pp. 1-2, doi: 10.1109/RADIO58424.2023.10146092.
 6. A. Kumar, **P. Verma**, P. Jindal, "Machine Learning Approach for SPR based Photonic Crystal Fiber Sensor for Breast Cancer Cells Detection", Conference: 2022 IEEE 7th Forum on Research and Technologies for Society and Industry Innovation (RTSI), Paris, France, Aug 2022.
 7. A. Kumar, **P. Verma**, P. Jindal, "Photonic Crystal Fiber Based Refractive Index Sensor for Cholesterol Sensing in Far Infrared Region", International Conference on Advances in Data Computing, Communication and Security, LNDECT, Springer, vol. 106, March 2022.
 8. K. Choudhary, **P. Verma**, A. Kumar, "Refractive Index-based Ethanol Sensor using Hollow Core Photonic Crystal Fiber in THz region", International Conference on Computational Electronics for Wireless Communications, LNNS, Springer, vol. 329, Jan 2022.
 9. D. Rajpoot and **P. Verma**, "Optimization of Sensing Time for Efficient Spectrum Utilization in NOMA Based Cognitive Radio Networks", Optical and Wireless Technologies, LNEE, Springer, NIT Jaipur, Sep. 2021.
 10. A. Kamboj, P. Jindal, **P. Verma**, "Physical Layer Security-Based Relay Selection for Wireless Cooperative Networks: A Reinforcement Learning Approach", Intelligent Computing and Communication Systems, Springer, pp. 115-122, June 2021
 11. D. Rajpoot and **P. Verma**, "Optimization of Number of Secondary Users in CSS for Maximizing the Spectrum Utilization", IEEE Students Conference on Engineering & Systems (SCES), Prayagraj, India, pp. 1-5, 2020.
 12. **P. Verma**, "Weighted Fusion Scheme for Cooperative Spectrum Sensing", International Conference on Industry 4.0 Technology (I4Tech), Pune, India, pp. 186-190, 2020.
 13. **P. Verma** and B. Singh, "Weighted Eigenvalues based Spectrum Sensing for Cognitive Radio Systems" Proceedings of International Conference on Big Data and Internet of Things Pages 61–64, BDIOT, Melbourne, Australia, August 2019.
 14. A. Chauhan and **P. Verma**, "Performance Evaluation of Hybrid RF/FSO Communication System in High Speed Train", International Conference on Intelligent Computing & Smart Communication (ICSC-2019), Tehri Garhwal, Apr. 20

15. A. Chauhan and **P. Verma**, "Throughput Maximization in High Speed Train using Hybrid RF/FSO Communication System", International Conference on Optical and wireless Technologies (OWT-2019), MNIT Jaipur, Dec 2019
16. R. Bajwa and **P. Verma** "Effect of Different Atmospheric Conditions on the Performance of the FSO System at 1550nm" 5th International Conference on Signal Processing and Integrated Networks (SPIN) 2018.
17. **P. Verma** and B. Singh, "Performance Analysis of Various Eigenvalue-Based Spectrum Sensing Algorithms for Different Types of Primary User Signals", Advances in Electronics, Communication and Computing, Lecture Notes in Electrical Engineering, Springer, vol. 443, pp.389-397, Jan 2018
18. D. Kumar and **P. Verma**, "Comparative study of Mamdani & Takagi-Sugeno models for spectrum access in cognitive radio networks," IEEE International Conference on Computational Intelligence and Computing Research (ICCIC), Madurai, pp. 1-5, Dec. 2015
19. S. Sharma and **P. Verma**, "On the cluster size of cognitive radio networks," International Conference on Signal Processing, Computing and Control (ISPCC), Wagnaghat, pp. 322-326, Sept. 2015
20. L. K. Mathew, S. Sharma and **P. Verma**, "An Adaptive Algorithm for Energy Detection in Cognitive Radio Networks," Second International Conference on Advances in Computing and Communication Engineering, Dehradun, pp. 104-107, 2015.
21. L. K. Mathew and **P. Verma**, "Double threshold energy detection using sequential cooperative spectrum sensing in Rayleigh fading," International Conference on Signal Processing and Communication (ICSC), Noida, pp. 83-87, Mar. 2015.
22. **P. Verma** and B. Singh, "Simulation study of double threshold energy detection method for cognitive radios," 2nd International Conference on Signal Processing and Integrated Networks (SPIN), Noida, pp. 232-236, Feb, 2015.
23. **P. Verma** and B. Singh, "Throughput analysis in cognitive radio networks," International Conference on Advances in Computing, Communications and Informatics (ICACCI), New Delhi, pp. 1199-1203, Sep. 2014.
24. M. K. Dhaka and **P. Verma**, "A relay based Cooperative Spectrum Sensing selecting maximum value of SNR in multi-channel Cognitive Radio," International Conference on Recent Advances and Innovations in Engineering (ICRAIE-2014), Jaipur, 2014, pp. 1-4.