Dr. Sandeep Raj
Ph.D., Electrical Engineering.

Room No. 101, IIIT Bhagalpur,
BCE Campus, Bhagalpur 813210, India.
✆ *+91-9386199102*
✉ *sraj.ece@iiitbh.ac.in*

The role of the teacher is like the proverbial 'ladder', it is used by everyone to learn and achieve his/her goals in life, but the ladder itself stays in its place. – A.P.J. Abdul Kalam

Current Position

09-Aug-2018 to Till Date — **Assistant Professor**, *Department of Electronics and Communication Engineering*, *Indian Institute of Information Technology Bhagalpur*

Area of Research

Artificial Intelligence, Internet-Of-Things, Signal & Image Processing, Embedded Systems

Education

2013–2018 — **Indian Institute of Technolgy Patna**, *Ph.D.*, Electrical Engineering, *CGPA:8.63/10*
Title: Development and hardware prototype of an efficient method for handheld arrhythmia monitoring device.

2009–2011 — **M. Tech. (Gold Medalist)**, *CGPA: 9.66/10*
Title: Automatic generation control of interconnected power system by intelligent PI controllers.

Courses Taught

Digital Signal Processors, Digital Image Processing and Computer Vision, Digital Electronics, Digital Signal Processing, Signals and Systems, Basic Electronics Circuits, Probablity and Random Process - Jointly.

Academic/Administrative Responsibilities at IIIT Bhagalpur

1. Head, Centre of Excellaence in AI & Data Science
2. Faculty Incharge – Finance and Accounts.
3. Faculty Incharge – Institute Electrical Works.
4. DDO – Government e-Marketing (GeM).
5. Coordinator – Hostel Affairs Board.

Member of Professional Bodies

Member, Institute of Electrical and Electronics Engineers (IEEE).

Past Experiences

Jul.–Dec. '12 — **Visiting Faculty**, In Dept. of Electrical Engineering, *At National Institute of Technology Patna*

Jun.–Jul. '12 — **Assistant Professor**, In Dept. of Electrical and Electronics Engineering, At *H.M.F.A. Memorial Institute of Engineering and Technology, Allahabad*

Aug. '11–Jun '12 — **Visiting Faculty**, *In Dept. of Electrical and Electronics Engineering*, At *Sam HigginBottom University of Agriculture, Technology & Sciences, Allahabad*

Fellowships and Awards

1. Received the best poster award in the School of Engineering and Technology at IIT Patna in the 4th Research Scholar's day held on 8th Mar 2014.
2. Received INSPIRE Fellowship awarded by Department of Science and Technology, Govt. of India vide DST/INSPIRE Fellowship/1378-2012 dated 03.10.2012 and vide Inspire Fellow code-IF120841.

Publications

Books:

1. V. Puiri, **Sandeep Raj**, A. Genovese, R. Srivastava, "Trends in deep learning methodologies", *series entitled Hybrid computational intelligence for pattern analysis and understanding*, Elsevier, 2020, Academic Press, 16th Nov 2020, Paperback ISBN: 9780128222263, eBook ISBN: 9780128232682.

Patents:

1. **Sandeep Raj**, and Arvind Choubey, "A Handheld Device for Bacterial and Viral Infection Detection Using X-rays and CT Images", *Indian Patent*, Appl. No.: 202031023859 (Under Examination).

2. **Sandeep Raj**, and Arvind Choubey, "Bacterial and Viral Infection Localization and Classification Using X-rays and CT Images", *Indian Patent*, Appl. No.: 202031024974 (Under Examination).

Journals:

1. **Sandeep Raj**, "An efficient method and point-of-care platform for real-time ECG monitoring", *IEEE Transactions on Consumer Electronics*, vol. 66, no. 2, May 2020, pp. 106-114.

2. **Sandeep Raj**, and K. C. Ray, "An efficient method and point-of-care platform for real-time ECG monitoring", *IEEE Transactions on Consumer Electronics*, vol. 64, no. 4, Dec. 2018, pp. 452-460.

3. **Sandeep Raj** and K. C. Ray, "A personalized arrhythmia monitoring platform", *Scientific Reports (Nature)*, vol. 8, no. 11395, Jul. 2018, pp. 1-11.

4. **Sandeep Raj**, K. C. Ray, "ECG signal analysis using dct-based dost and pso optimized svm", *IEEE Transactions on Instrumentation and Measurement*, vol. 66, no. 3, pp. 470-478, Mar. 2017.

5. **Sandeep Raj**, and K. C. Ray, "Automated recognition of cardiac arrhythmias using sparse decomposition over composite dictionary", *Comput. Methods Programs Biomed. (Elsevier)*, vol. 165, Oct. 2018, pp. 175-186.

6. **Sandeep Raj**, K. C. Ray and O. Shankar, "Development of Robust, Fast and Efficient QRS Detector: A Methodological Review", *Australas Phys Eng Sci Med. (Springer)*, vol. 41, no. 3, Sept. 2018, pp. 581-600.

7. **Sandeep Raj**, K. C. Ray, "Sparse representation of ECG signals for automated recognition of cardiac arrhythmias", *Expert Syst Appl. (Elsevier)*, vol. 105, Sept. 2018, pp. 49-64.

8. **Sandeep Raj**, K. C. Ray, and O. Shankar, "Cardiac arrhythmia beat classification using DOST and PSO tuned SVM", *Comput. Methods Programs Biomed. (Elsevier)*, vol. 136, pp. 163–177, Nov. 2016.

9. **Sandeep Raj**, G. P. Chand and K. C. Ray, "ARM-based arrhythmia beat monitoring system", *Microprocessors and Microsystems (Elsevier)*, vol. 39, no. 7, pp. 504–511, Oct. 2015.

10. **Sandeep Raj**, K. Maurya and K. C. Ray, "A Knowledge-based Real-Time Embedded Platform for Arrhythmia beat classification", *Biomedical Engineering Letters (Springer)*, vol. 5, no. 4, pp. 271–280, Dec. 2015.

11. **Sandeep Raj**, S. Luthra, and K. C. Ray, "Development of handheld cardiac event monitoring system", *IFAC-PapersOnLine (Elsevier)*, vol. 48, no. 4, pp. 71–76, 2015.

Conferences:

1. **Sandeep Raj**, "An Efficient Analysis Scheme for Intelligent ECG Monitoring Devices," *In IEEE Zooming Innovation in Consumer Technologies Conference (ZINC 2020)*, University of Novi Sad, Serbia, 26th May 2020, (Accepted).

2. A. Aman, A. Singh, A. Raj, and **Sandeep Raj**, "An Efficient Bar/QR Code Recognition System for Consumer Service Applications," *In IEEE Zooming Innovation in Consumer Technologies Conference (ZINC 2020)*, University of Novi Sad, Serbia, 26th May 2020, (Accepted).

3. **Sandeep Raj** and K. C. Ray, "Application of Variational Mode Decomposition and ABC Optimized DAG-SVM in Arrhythmia Analysis," *In IEEE 7th Int. Symposium on Embedded computing and system Design (ISED 2017)*, NIT Durgapur, 18th -20th Dec. 2017, pp. 1-5.

4. **Sandeep Raj**, T. C. Krishna Phani, Jyotirmayee Dalei, "Power Quality Analysis Using Modified S-Transform on ARM Processor", *In IEEE 6th Int. Symposium on Embedded computing and system Design (ISED 2016)*, IIT Patna, 15th -17th Dec. 2016, pp. 166-170.

5. **Sandeep Raj**, and K. C. Ray, "A comparative study of multivariate approach with neural networks and support vector machines for arrhythmia classification," *in Proc. IEEE Int. Conf. on Energy, Power Environment (ICEPE)*, NIT Shillong, India, 12th-13th Jun. 2015, pp. 1–6.

6. **Sandeep Raj** and S. Prakash, "Load Frequency Control of Two Area Interconnected Thermal Power System by Intelligent PI Controllers", *In National Conference on Advanced Computing Techniques in Science and Technology*, U.C.E.R. Allahabad, Feb. 2012, pp. 37-41.

7. **Sandeep Raj** and S. Prakash, "Automatic Generation Control of Interconnected Power System by Intelligent PI controllers", *In 3rd National Conference on Advanced Power Systems (NCAPS-11)*, K.K.W.I.E.R. Nasik, Dec. 2011, p. 55.

Book Chapters:

1. **Sandeep Raj**, "An Efficient Method for Computer-aided Diagnosis of Cardiac Arrhythmias", *In: Jain V., Chatterjee J. (eds) Machine Learning with Health Care Perspective*. Learning and Analytics in Intelligent Systems, Springer Nature, vol. 13, pp. 295-315, Mar. 2020.

2. **Sandeep Raj**, "A Real-Time ECG Processing Platform for Telemedicine Applications", *Advances in Telemedicine for Health Monitoring: Technologies, Design, and Applications*, IET, 2019.

3. **Sandeep Raj** and A. Choubey, "Cardiac arrhythmia recognition using modified stockwell transform and ABC optimized twin-SVM", *Computational Intelligence For Machine learning and Health care informatics*, De-Gruyter (Walter de Gruyter GmbH), Jun. 2020, pp. 35-52, eISBN: 9783110648195, doi: https://doi.org/10.1515/9783110648195-003.

4. **Sandeep Raj**, "An Improved Time-Frequency Method for Efficient Diagnosis of Cardiac Arrhythmias", *Demystifying Big Data, Machine Learning and Deep Learning for Healthcare Analytics*, Academic Press, Jun. 2021, pp. 185-213, ISBN 9780128216330,

5. J. Kaur, N. Mittal, S. Kaur, R. Srivastva, **Sandeep Raj**, "Segmentation and classification of Hand Symbol Images using Classifiers", *series entitled Hybrid computational intelligence for pattern analysis and understanding*, Academic Press, Jan. 2021, pp. 265-275.

M. Tech Dissertations Guided

2012 **Prabhakar Kumar Prabhat, M.Tech (Power System), Roll No-1122011**, *Practical Approach for mitigating voltage sag during transmission line fault using STATCOM*, Dept. of Electrical Engineering, NIT Patna
–As Co-supervisor with Prof. M. M. Choudhary as Supervisor.

2012 **Varun Singh, M.Tech (Power System), Roll No-1122024**, *Cascade H. Bridge multilevel converter for Grid connected photovoltaic systems*, Dept. of Electrical Engineering, NIT Patna
–As Co-supervisor with Prof. M. M. Choudhary as Supervisor.

Workshop Organized

15th-19th November 2021 **As Coordinator, Five days workshop on "Artificial Intelligence and Internet-of-Things Applications in Biomedical Engineering"**, In Dept. of Electronics and Communication Engineering, at IIIT Bhagalpur

27th-31st May 2019 **As Coordinator, Five days workshop on "IoT and Embedded System Design"**, *In conjuction with E & ICT Academy, IIT Guwahati and Digital Shark Technologies*, In Dept. of Electronics and Communication Engineering, at IIIT Bhagalpur

Delievered Talks

13th August 2021 **"Point-of-care Platform for Real-Time ECG Monitoring"**, In ATAL Faculty Development Program, at National Institute of Technology Jamshedpur

19th June 2021 **"How AI Works"**, at All India Institute of Medical Sciences (AIIMS) Patna

21th Apr 2021 **"Development of Handheld ECG Monitoring Devices"**, In ATAL Faculty Development Program, at Centre of Advanced DEvelopment and Computing (CDAC) Patna

27th-28th Jan 2021 **"Reserach Process and Methodology"**, In Dept. of Electronics and Communication Engineering, at Bhagalpur College of Engineering, Bhagalpur

04th Feb 2021 **"An Introduction to Signal Processing And Machine Learning Using MATLAB"**, In Dept. of Electronics and Communication Engineering, at Indian Institute of Information Technology, Kota

08th-12th Mar 2021 **"Advances in Biosignal & Image Processing"**, In Dept. of Electronics and Communication Engineering, at Govt.Engg. College, Raipur(CG)

| 16th May 2021 | **"Role of AI in TAckling COVID-19 disease"**, Online Webinar, VITTI Research Foundation |

Reviewer in Journals/Conferences

Journals:

1. IEEE Transactions on Industrial Electronics.
2. IEEE Journal of Biomedical and Health Informatics.
3. IEEE Transactions on Instrumentation and Measurement.
3. IEEE Signal Processing Letters.
5. IEEE Access.
6. IET Signal Processing.
7. Computer Methods and Programs in Biomedicine – (Elsevier).
8. Computers in Biology and Medicine – (Elsevier).
9. International Journal for Numerical Methods in Biomedical Engineering – (Wiley).
10. Australasian Physical & Engineering Sciences in Medicine – (Springer).
11. Journal of King Saud University – Computer and Information Sciences – (Elsevier).
12. Biomedical Engineering: Applications, Basis and Communications (BME).
13. IETE Journal of Research.

Conferences:

1. International Conference on Artificial Intelligence, Information Processing and Cloud Computing (AIIPCC 2019), Dec. 19th - 21st, Sanya, China.
2. 19th International Conference on BioInformatics and BioEngineering (BIBE 2019), Oct. 29th - 30th, Athens, Greece.
3. 18th IEEE International Conference on BioInformatics and BioEngineering (BIBE 2018). Oct. 29th-31st, Taichung, Taiwan.
4. International Conference on Computational Intelligence: Theories, Applications and Future Directions, Dec. 6-8th, 2017, IIT Kanpur, India.

TPC Member in Conferences:

1. IEEE-iSES 2019, Dec. 16th - 18th 2019, NIT Rourkela, India.

| October 2007 | **Attended and secured 7th Rank in the "Artificial Intelligence Workshop"**, In Dept. of Computer Science and Engineering, at IIIT Allahabad |

Other Details

- Director: XVIZN PVT. LTD., **DIN No.:** 08933758.
- Developed a **AI based COVID-19 screening software by processing Chest X-rays Images**: Approved by ICMR Advisory Committee.

Declaration

I, Dr. Sandeep Raj, hereby declare that the above information provided by me is true to the best of my knowledge and belief.

Place: IIIT Bhagalpur.

Date: 08-Dec-2021.   **(Signature)**