Curriculum Vitae

CONTACT INFORMATION

Dr. ARUN KUMAR SHARMA

144, New RA, IIT Kanpur, U.P., India - 208016

+918470035605 arunshr.iitk@gmail.com https://arnksh.github.io/

Profile Summary

Post-Doctoral Researcher, EE, IIT Kanpur, *May 2025 to Current.*
Post-Doctoral Researcher, SMSS Lab, Dept. of Mechanical Engineering, IIT Kanpur. *September 2024 to April 2025.*

Ph.D., Dept. of Electrical Engineering, IIT Kanpur.
Title: ***Deep Learning Architecture Optimization and Application to Classification Problems.***

RESEARCH INTEREST

Deep Learning, Computer Vision, Pattern Recognition, AI in Engineering Design.

I am highly inclined towards research in AI for real time applications.

EDUCATION

January 2018–2024 — Doctor of Philosophy, Date of Defense: August 27, 2024 — CGPA: 10

Electrical Engineering, IIT Kanpur, U.P., India

Thesis Title: ***Deep Learning Architecture Optimization and Application to Classification Problems.***

July 2009–July 2011 — Master of Technology — CGPA: 8.86

Specialization: Instrumentation,

Department of Electrical Engineering, IIT Kharagpur, W.B., India

Thesis Title: **Estimator Based Robust Stabilization of Uncertain Networked Control System.**

July 2005–July 2009 — Bachelor of Technology in Electrical Engg. — Marks: 78.42%

BIT Sindri, Dhanbad, Jharkhand, India

Gate Score: GATE (2009) — All India Rank: 152 — Score: 695

WORK EXPERIENCE

May 2025-Current — Post-Doctoral Researcher, EE, IIT Kanpur,
Responsibility: AI for 6G standardization

Sept. 2024–May 2025 — Post-Doctoral Researcher, SMSS Lab, Dept. of Mechanical Engineering, IIT Kanpur, India.

Responsibilities: Research on AI for Engineering Design.

June 2022–May 2023 — Lead AI Scientist, Part-Time during PhD, Remotely, Avermass GmbH, Germany
Responsibilities: Leading Machine learning / Deep learning R&D team.

July 2011–July 2013 — Assistant Professor, IIMT College of Engineering, Greater Noida, India

Responsibilities: Teaching & Research.

July 2013–Nov 2017 — Assistant Professor, AKGEC, Ghaziabad, U.P., India

Responsibilities: Teaching & Research.

RESEARCH DETAILS

Post-Doctoral Research

AI for Engineering Applications:

1. Developed Inverse design of metastructures for tailored vibration mitigation.
2. Current-aware multi-head attention model for actuation prediction of bioinspired SMA powered metamaterial-based elbow joint.
3. Cross-Spectral Vision Transformer for biometric authentication using Forehead Subcutaneous Vein Pattern and Periocular Pattern.

Ph.D. Research

Title: **Deep Learning Architecture Optimization and Application to Classification Problems.** The main contributions of the thesis are listed below:

4. Developed an improved and faster parameter optimization in parallel computational framework for "Aerodynamic Modelling of ATTAS Aircraft using Mamdani Fuzzy Inference Network".
5. Developed a Quick Learning Mechanism with Cross-Domain Adaptation for Intelligent Fault Diagnosis. It opens the path for quick model evaluation required in model selection algorithms.
6. Developed an algorithm for architecture optimization (EvoN2N: Transfer Learning based Evolutionary Deep Neural Network for Intelligent Fault Diagnosis) using the quick learning mechanism.
7. Extended the work EvoN2N to a guided evolutionary algorithm: "Guided Sampling-based Evolutionary Deep Neural Network for Intelligent Fault Diagnosis".
8. Further, introduced A Novel Vision Transformer with Residual in Self-attention for Biomedical Image Classification.

Industrial Research

Worked on following Projects as R&D lead AI Scientist at Avermass GmbH, Germany (Remote)*:*

1. **Face Forgery Detection:** Cascaded Twin models: ViT and Yolov7 were trained to classify and detect the possible forgery/alteration in face image. The final model can detect the possible forgery with 95% accuracy.
2. **Image data synthesis:** Implemented DCGAN with pytorch for fake face data generation to increase the training database and **Image-to-Image Translation** using cycle GAN.
3. **End2End image forgery** detection using ViT and yolov7 model for the detection of image-based fake news stories circulated in form of forged images.
4. **Document AI:** Worked for development of CV processing and screening tool that can automatically shortlist CVs based on given JDs.

PUBLICATIONS

Journals

1) **Arun K. Sharma** and Nishchal K. Verma. "Guided Sampling-based Evolutionary Deep Neural Network for Intelligent Fault Diagnosis." Engineering Applications of Artificial Intelligence, Volume 128, 2024, 107498, ISSN 0952-1976, https://doi.org/10.1016/j.engappai.2023.107498.

2) **Arun K. Sharma** and Nishchal K. Verma. "Quick Learning Mechanism with Cross-Domain Adaptation for Intelligent Fault Diagnosis." in IEEE Transactions on Artificial Intelligence, Volume: 3, Issue: 3, June 2022.

3) **Arun K. Sharma**, Dhan Jeet Singh, V. Singh, N. K. Verma "Aerodynamic Modelling of ATTAS Aircraft using Mamdani Fuzzy Inference Network" in IEEE Transactions on Aerospace and Electronic Systems, Volume: 56, Issue: 5, October 2020.

4) A Dwivedi, G Ray, **Arun K. Sharma**, "Genetic Algorithm Based Decentralized PI Type Controller: Load Frequency Control" Journal of The Institution of Engineers (India): Series B, in May 2015.

5) **Arun K. Sharma**, G. Ray, "Robust Controller with State-Parameter Estimation Algorithm for Uncertain Networked Control System" published in IET Control Theory & Applications, Volume 6, Issue 18, 6 December 2012, p. 2775 – 2784.

Conferences

1) **Arun K. Sharma**, Dhanjeet Singh, and Nishchal K. Verma, "Data Driven Aerodynamic Modeling Using Mamdani Fuzzy Inference Systems", 2018 International Conference on Sensing, Diagnostics, Prognostics, and Control, Xiâ€™an, China.

2) **Arun K. Sharma**, Vikas Singh, Nishchal K. Verma and Jie Liu, "Condition Based Monitoring of Machine using Mamdani Fuzzy Network", 2018 Prognostics and System Health Management Conference, PHM-Chongqing, Chongqing, China, October 26-28, 2018.

3) **Arun K. Sharma**, S. Pandey, "Automatic Generation Control of Interconnected Power System using Internal & Variable System Controller", 2nd National Conference on Advancement of Electronics & Communication Technology and Engineering, Greater Noida, India, Feb 2012.

4) **Arun K. Sharma**, "Adaptive Algorithm for State and Parameter Estimation in a system with Parametric Uncertainties", National Conference on Advances in Electrical Power and Energy Systems, AKGEC, Ghaziabad, India, Sept. 2013.

Preprints

1) **Arun K Sharma**, Shubhobrata Bhattacharya, Motahar Reza , "Dual Channel Multi-Attention in ViT for Biometric Authentication using Forehead Subcutaneous Vein Pattern and Periocular Pattern", arXiv preprint arXiv:2412.19160.

2) Bishakh Bhattacharya, Tanuj Gupta, **Arun K. Sharma**, Ankur Dwivedi, Vivek Gupta, Subhadeep Sahana, Suryansh Pathak, Ashish Awasthi, "Inverse design of potential metastructures inspired from Indian medieval architectural elements", arXiv preprint DOI: arXiv:2412.12122. Submitted to Nature Communication Engineering.

3) **Arun K. Sharma** and Nishchal K. Verma, "A Novel Vision Transformer with Residual in Self-attention for Biomedical Image Classification," arXiv preprint, DOI: arXiv:2306.01594v1. [Submitted to IEEE Transactions on Medical Imaging].

4) **Arun K. Sharma** and Nishchal K. Verma. "Knowledge Transfer based Evolutionary Deep Neural Network for Intelligent Fault Diagnosis." arXiv preprint, DOI: arXiv:2109.13479, under review in IEEE transactions on Evolutionary Computations.

PROGRAMING SKILS

(i) Python with ML & DL Libraries,
(ii) NLP tools
(iii) NI LabVIEW
(iv) MATLAB

TEACHING WORK

During Ph.D. (January 2018 - Present)

Teaching Assistant:

1) Control System Analysis
2) Electrical Machines/ Power System
3) Control Systems Lab
4) Artificial Intelligence, Machine learning, and Applications

Tutorship:

1) Introduction To Electronics
2) Control Systems Lab (Online version)
3) Control Systems Lab (Offline version)

As teaching (July 2011 – Nov. 2018

Instructor for
Theory Courses:

1) Control systems and applications.
2) Electrical Machines and Control
3) Measurement and Instrumentation
4) Sensor and Transducer

Lab courses:

1) Sensor and Transducer Lab
2) Electrical machines Lab
3) LabVIEW based Instrumentation Lab

LAB SETUP

Supervised the following Lab setups at AKGEC, Ghaziabad

1) Sensor and Transducer Lab
2) Electrical machines Lab

MENTORING

During Ph.D.

Student Intern name: Basant Kumar
Title: “Study of Net2Net transformation and image classification using Deep Learning”

During Teaching (July 2011 – Nov. 2018)

Mentored B. Tech level projects on ML applications:

1) Credit Card fraud detection using ML algorithms (implemented in *scikit-learn*).
2) Lesion data classification using CNN (implemented in Pytorch).
3) Diabetic dataset classification (implemented in *scikit-learn*).
4) Information retrieval of news dataset using NLP: Classification and clustering of text dataset.
5) Word embeddings and sentiment analysis for Movie Review dataset: Tokenization, Lemmatization, Text Normalization, Word2vec embeddings, textblob, and SentimentIntensityAnalyzer.

ORGANISATIONAL / MANAGERIAL SKILLS

Organizing committee member:

1) 2nd National Conference on “Advancement of Electronics & Communication Technology and Engineering” at IIMT, Greater Noida, India.
2) 2013 IEEE Sponsored National Conference on Advances in Electrical Power and Energy Systems, Sept. 2013 at AKGEC, Ghaziabad, UP, India.
3) 2018 IEEE CIS Summer/Winter School on Deep Learning and Computational Intelligence, Dec 5-7, 2018, at EE dept. IIT Kanpur.
4) QIP Short Term Course on Artificial Intelligence and Fuzzy Systems: Theories, Concepts, and its applications, Dec. 9-13, 2019, at EE dept. IIT Kanpur.

Member of Model Club (2007-08) at BIT Sindri, Dhanbad.

TRAINING AND WORKSHOPS

1) Attended training program on “Sensor & Instrumentation” by AKGEC-NI LabVIEW Academy, Aug. 2013, Ghaziabad.
2) Attended UGC sponsored short term training program “Signal Processing in Modern Electrical Systems” at EE dept., DTU, Delhi, 9-13th Dec. 2013.
3) Attended Faculty Training Program “Advances in Sensors, Instrumentation and Control” organized by the dept. of EE 7-9th May 2014 at AKGEC, Ghaziabad (U.P) India.
4) Attended “Technical Teachers’ Role, Self-Esteem, Motivation and Professionalism Development through ICT” conducted by Media and Continuing Education Centre, 8-12th June 2015, AKGEC, Ghaziabad (UP), India.
5) Attended Training Program on “Recent Advances in Renewable Energy Technologies and Smart Micro-grids”, 13-17th Sept. 2016, at KNIT, Sultanpur, U.P., India.
6) Attended training Program on “Instrumentation and Automation with LabVIEW”, 9-10th Sept. 2016, at AKGEC-NI LabVIEW Academy, Ghaziabad, UP, India.

ADDITIONAL INFORMATION

LinkedIn URL	https://www.linkedin.com/in/arun-sharma-3684b112a
Google Scholar page	https://scholar.google.com/citations?user=Lye6naYAAAAJ&hl=en
ORCID id	https://orcid.org/0000-0003-2270-4714
Homepage and GitHub repos	https://arnksh.github.io/ https://github.com/arnksh

Contact Details of References

1. Prof. Bishakh Bhattacharya,

   HAG Professor, Mechanical Engineering, IIT Kanpur, U.P. India

   bishakh@iitk.ac.in, +91-512-259-7824

2. Prof. Goshaidas Ray,

   Professor (retd.), Electrical Engineering, IIT Kharagpur. W.B., India, 721301

   Contact: gray@ee.iitkgp.ac.in, +91-9679772020

3. Prof. Motahar Reza,

   Associate Professor and HOD,

   GITAM University, Hyderabad, A.P., India

   motaharreza90@gmail.com, +91-7873049059