Anshul Kumar Yadav

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PROFESSIONAL SUMMARY

Currently, I work as **Project Technical Assistant** at **Computer Science & Engineering department, IIT-Bombay**, concentrating on developing artificial intelligence frameworks for healthcare use cases. I have research experience in computational intelligence, computer vision, and optimization frameworks. I am keen on pursuing higher studies and helping organizations develop artificial intelligence and computing solutions.

EDUCATION

Swami Keshvanand Institute of Technology Management & Gramothan Jaipur, India
*B.Tech. in Electrical Engineering; **GPA: 9.09/10.00 (Distinction)*** *August 2019 – July 2023*
Research Focus: **Smart Grid Technology and Applications**

SKILLS

Technical: Python (Plotly, PyTorch, Lightning, TensorFlow, TensorFLow Lite), Git, Docker, MATLAB, Latex, Edge Impulse, MS Office (MS Excel, MS Outlook, MS PowerPoint, MS OneNote), Notion, GPU platform (DGX Server), Linux

Bibliographical software: VosViewer, SciMAT, Bibliometrix

Deployment boards: Esp32, Nano 33 BLE, Raspberry Pi, Jetson Nano

Soft: Ability to work in diverse environments, handle multi-disciplinary projects, problem-solver, pro-active, willing to learn outside the comfort zone, good leadership, communication, mentoring, and presentation skills.

RESEARCH EXPERIENCE

Computer Science & Engineering, IITB Bombay, India
Project Technical Assistant *April 2025 – Present*

- **Image Quality Assessment Tool**
  * Implemented lightweight classification models using TinyViT and MobileViT architectures, ensuring efficient inference suitable for deployment in low-resource healthcare settings.
  * Explored semi-supervised learning techniques to reduce the annotation burden.

CSIR-Central Electronics Engineering Research Institute, Govt. of India Pilani, India
Junior Research Fellow *August 2023 – March 2025*

- **Revitalizing Ancient Murals Using Deep-Learning Techniques**
  * Performed data acquisition at Mandawa Kothi and image preprocessing to study realistic mural damage.
  * Developed a damage segmentation framework employing GANs and an ensemble network to identify varying levels of damage in Shekhawati murals.
  * Studied and implemented inpainting models including CNN-, GAN-, and Transformer-based networks to identify research gaps.
  * Developed an algorithm integrating a damage segmentation model, visual feature-based clustering, and modular inpainting for refined results.
- **Battery Management System for Redox Flow Battery (RFB)**
  * Studied the operation and energy management of an industrial-grade 5kWh RFB battery.
  * Developed a regression model for state-of-charge prediction, including feature selection and dataset augmentation.
  * Deployed TinyML models to Arduino IoT boards using TensorFlow Lite.
  * Integrated node-edge-cloud computing paradigms for enhanced SoC estimation.
- **Additive Manufacturing Anomaly Detection**
  * Designed an image- and sensor-based anomaly detection framework with hardware integration.
  * Collected vibration data using MPU 6050 sensors on two distinct 3D printing setups.
  * Processed vibration signals to distinguish failure types and developed a computationally efficient classifier.
- **X-ray AI: Baggage Security System**
  * Built an AI-enhanced baggage scanner using KritiScan 6040 with YOLOv11 for real-time threat detection.
  * Identified prohibited items like weapons, tools, and sharp objects in X-ray imagery.

    ∗ Enabled threat object recognition in video mode, extending functionality for recorded footage.

[Raman Lab](#)   Jaipur, India

Research Intern   *June 2022 – August 2023*

- Developed a hybrid optimization algorithm for a multi-objective smart home energy management system to minimize electricity costs without compromising comfort.
- Designed and simulated a renewable-integrated microgrid with PV, wind, battery, genset, and V2G systems. Used metaheuristics to minimize cost and avoid load curtailment.
- Optimized parameters for a semi-empirical battery degradation model to estimate Li-ion battery state-of-health.
- Created a networked microgrid using Australian grid data and implemented fog-cloud architecture for data processing and uncertainty analysis.
- Applied Q-learning with a novel two-stage reward function to optimize household energy usage, ensuring convergence and constraint adherence.

PUBLICATIONS

Journal Publications

7. **A. K. yadav**, et al. "A Systematic Review on Advancing Agricultural Applications with Machine Learning assisted Cold Atmospheric Plasma." Submitted, Computers and Electronics in Agriculture.
6. **A. K. yadav**, et al. "Reconstructing degraded areas of old Indian Wall Paintings through Image Inpainting." In Review, International Journal of Arts and Technology.
5. **A. K. yadav**, et al. "Assessment of Deep Learning algorithms for Damage Segmentation in Indian Murals." Accepted, International Journal of Arts and Technology.
4. A. K. Saini, **A. K. yadav**, et al. "A Comprehensive review on technological breakthroughs in precision agriculture: IoT and emerging data analytics.", European Journal of Agronomy.
3. **A. K. yadav**, et al. "A Systematic Review on Energy Management for Redox Flow Batteries via Intelligent Data Processing." Revision, Energy Storage.
2. **A. K. yadav**, et al. "Deep learning-based framework for damage introduction and segmentation in ancient wall paintings." In Review, Sensing and Imaging.
1. S. Yelisetti, **A. K. yadav**, et al. "Application of Sine Cosine Weighted Mean of Vector Optimization Algorithm for Optimal Energy Consumption Cost in Residential Buildings." In Review, Journal of Building Engineering.

Conference Publications

20. A. Ranjan, ..., **A. K. yadav**, et al. "Evaluation of a ± 5 kV Solid-state-based 200 ns duration Pulse Generator." Accepted, *1st International Conference on Power Electronics Converters in Transportation and Energy Application*
19. V. S. Mahala, **A. K. yadav**, et al. "Emission Based Energy Management Framework for Networked Microgrids using Edge-Fog Computing." Accepted, *2025 5th IEEE International Conference on Sustainable Energy and Future Electric Transportation (SEFET)*
18. **A. K. yadav**, et al. "Generalisable Predictive Maintenance in Additive Manufacturing using Machine Learning.' Accepted, *4th IEEE International Conference on Innovative Sustainable Computational Technologies*
17. **A. K. yadav**, et al. "Detecting Additive Manufacturing Anomalies with a Shallow Residual Convolution Network." Accepted, *2024 Unified International Conference on Emerging Technologies in Cyber-Physical Systems and Industrial AI (Unified-2024)*
16. **A. K. yadav**, et al. "Computing Framework for SoC Estimation using On-device Learning." Accepted, *2024 IEEE 11th Power India International Conference (PIICON)*
15. **A. K. yadav**, et al. "Edge Computing enabled Battery State of Charge estimation using Tiny Machine Learning techniques." Accepted, *2024 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)*
14. V. S. Mahala, **A. K. yadav**, et al. "Bi-Level Optimization Framework for Energy Management in Networked Microgrid Using Edge-Fog Computing Paradigm." Accepted, *2024 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)*

13. **A. K. yadav**, et al. "Machine learning based data-driven approach for state-of-charge estimation in redox flow battery." *2024 15th International IEEE Conference on Computing Communication and Networking Technologies (ICCCNT)*

12. A. M. Dharwa1, **A. K. yadav**, et al. "Steel surface defect detection using machine learning techniques." *2024 IEEE International Conference on Electronics, Communication and Signal Processing (ICESP)*

11. V. S. Mahala, **A. K. yadav**, et al. "Uncertainty Estimation of PV and Load Using Deep Learning for Networked Microgrid." *2024 4th IEEE International Conference on Sustainable Energy and Future Electric Transportation (SEFET)*

10. **A. K. yadav**, et al. "Uncertainty aware State-of-Charge estimation for Li-ion Batteries using Deep Learning.", *2023 2nd IEEE International Conference on Measurement, Instrumentation, Control, and Automation (ICMICA)*

9. **A. K. yadav**, et al. "An insight into energy management through smart data analytics for redox flow battery." Conference abstract, *2024 International Conference on Sustainable Energy and Environment (IC-SEE)*

8. **A. K. yadav**, et al. "Revitalizing ancient murals in the Shekhawati region through image inpainting techniques." *2024 11th IEEE International Conference on Signal Processing and Integrated Networks (SPIN)*

7. A. Saxena, **A. K. yadav**, et al. "Seven Sisters Optimization Algorithm." *2023 2nd IEEE International Conference on Futuristic Technologies (INCOFT)*

6. K. Baberwal, **A. K. yadav**, et al. "Data Driven Energy Management of Residential PV-Battery System Using Q-Learning." *2023 IEEE International Conference on Recent Advances in Systems Science and Engineering (RASSE)*

5. V. S. Mahala, **A. K. yadav**, et al. "Networked Hybrid AC-DC Microgrids: Leveraging Fog Computing and Linear Solver for Efficient Energy Management." *2023 IEEE International Conference on Recent Advances in Systems Science and Engineering (RASSE)*

4. N. Kumar, **A. K. yadav**, et al. "Battery Energy Storage Sizing and Operational Strategy for Microgrid Considering Electric Vehicle." *2023 3rd IEEE International Conference on Sustainable Energy and Future Electric Transportation (SEFET)*

3. S. Bharti, ..., **A. K. yadav**, et al. "Optimal Parameter Estimation of CAPN Model for Li-ion Battery." *2023 IEEE International Conference on Computer, Electronics & Electrical Engineering & their Applications (IC2E3)*

2. **A. K. yadav**, A. Sharma, et al. "Optimization Scheme for Power Transmission in Wireless Sensor Network." *2023 IEEE International Conference on Power, Instrumentation, Energy and Control (PIECON)*

1. V. K. Saini, **A. K. yadav**, et al. "Multi-Agent based Cloud Energy Storage Framework for Residential Community." *2022 IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES)*

Awards, Achievements, & Certificates

Examination: UGC-National Eligibility Test (Dec-2024, 85.03%)

Best Paper Awards: at PIECON-(2023) for undergraduate project, ICMICA-(2024)

Best Poster Awards: SEFET-(2024)

IELTS Score: 7.5/9 (Listening: 7.5, Reading: 8.5, Writing: 7.0, Speaking: 7.0)

LEAD1x: Exercising Leadership: Foundational Principles: Funded by Aspire Institute, Harvard University

Positions: Student editor at Skit Times (College Magazine, 2019-2022), IEI student member (2019-2023)

LinkedIn badges: Machine Learning, MATLAB, GitHub, Docker

Certifications: Python, MATLAB, Simulink, Metaheuristic Optimization, Data Science

Referees

Dr. Rajesh Kumar
Professor of Artificial
Intelligence, University
of Johannesburg
Group Leader, Raman Lab
✉ rkumar.ee@mnit.ac.in

Anil Kumar Saini
Senior Principal Scientist,
Societal Electronics Group,
CSIR-Central Electronics
Engineering Research
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Dr. Ravita Lamba
Assistant Professor,
Department of Hydro and
Renewable Energy
Indian Institute of
Technology. Roorkee
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