Dr. Rani Kumari

Ph.D from Computer Science and Engineering – Birla Institute of Technology, Ranchi, India

✉ rkd.bit@gmail.com
DOB: 24 OCT 1991, (Address: Peltolantie 18A 59, Oulu, Finland, 90230)

Passionate researcher with expertise in image processing, deep learning, and NLP, dedicated to advancing applied image analysis and computing through innovative model development and multidisciplinary collaboration.

Thesis title

Optimizing Digital Image Watermarking in the Fractional Fourier Domain Using Metaheuristic Approaches
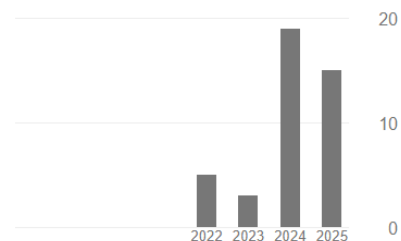
Research Interests

Image Processing, Machine learning, Deep Learning, Medical Image Analysis, TensorFlow,Server Programming,

Summary of Publications

- #Web of of Journal Articles: **08**
- #of Conference Article: **04**
- #of Under review: **02**

Source: Google Scholar
(On January 17, 2026)

Cited by

	All	Since 2020
Citations	42	42
h-index	4	4
i10-index	0	0

Recent position

Researcher	**Uppsala University, Sweden**
VI3 Division,	*May-2024 to June-2025*

Working in Sponsored Projects from Lantmännen.
Please visit the link the for see the running architecture. http://34.55.57.104:8050/?user=Rani

- Developing deep learning models based on transfer learning (ImageNet) for image classification tasks, using CI/CD framework.
- Managing and analysing large datasets (UMAP and other dimension reduction and visualization) to improve model accuracy and robustness.
- Collaborating with cross-functional teams to integrate machine learning solutions into existing systems.

Education

Degree Programs

Doctor of Philosophy	**Birla Institute of Technology, Ranchi, India**
Computer Science	*2018–2023*

CGPA: 8.00/10
Thesis Title: Optimizing Digital Image Watermarking in the Fractional Fourier Domain Using Metaheuristic Approaches

Master of Technology	**Maulana Abul Kalam Azad University of Technology, Kolkata, India**
Computer Science	*2014–2016*

CGPA: 6.88/10
Thesis Title: The Power of Biometric Indicators: Leveraging Physiological Signals to Detect and Analyse Emotions

Bachelor of Technology	**National Institute of Science and Technology, Berhampur, Odisha, India**
Computer Science	*2010–2014*

CGPA: 7.87/10
Project Title: The Fastest Data Backup Tool on Android: Super Backup

Schooling Education

○ **Senior Secondary** **KTI College, Ranchi, India**
  (Science) *2007–2009*
  Performance: 60.4%

Technical and Personal skills

- **Languages:** Strong reading, writing, and speaking competencies in English and Hindi.
- **Programming Languages:** Python, C, C++, Core Java, MATLAB.
- **Frameworks:** TensorFlow (used for image classification with transfer learning).
- **Libraries:** NumPy, Pandas, Matplotlib, Scikit-Learn.
- **Expertise:** Image and Signal Processing, Computer Vision, Machine/Deep Learning, and Heuristic Algorithms.
- **Technologies:** HTML, Flask, JavaScript, Apache Web Server.
- **Databases:** MySQL, PostgreSQL.

Publications

Journals

1. Rani Kumari, Ida Maria Sintorn et al.,
   Investigating Performance and Key Factors for Grain Image Classification Using Convolutional Neural Networks, *Scientific Reports, Nature Publishing, Accepted, 2025 [**Q1** IF: **3.9**, SCI]*
2. Rani Kumari, Dinesh Kumar Sah ✉ et.al
   Advancing Medical Recommendations with Federated Learning on Decentralized Data: A Roadmap for Implementation, *IEEE Transactions on Consumer Electronics March 2023., [**Q1** IF: **10.9**]*
3. Rani Kumari, Dinesh Kumar Sah ✉ et.al,
   Acoustic signal-based indigenous real-time rainfall monitoring system for sustainable environment, *Sustainable Energy Technologies and Assessments, October 2021 [**Q1** IF: **7.0**]*
4. Debendra Muduli, *Dinesh Kumar Sah, Rani Kumari* ✉ *et.al*
   Retinal Imaging based Glaucoma Detection using Modified Pelican Optimization based Extreme Learning Machine, ***Scientific Reports***, *Nature Publishing Group UK London, In-Press. [**Q1** IF: **3.9**]*
5. Rani Kumari, Abhijit Mustafi,
   An optimized framework for digital watermarking based on multi-parameterized 2D-FrFT using PSO, *Optik, Elsevier, Volume 248, Pages 168077, 2021 [IF: **3.1**, SCI]*
6. Rani Kumari, Abhijit Mustafi,
   The spatial frequency domain designated watermarking framework uses linear blind source separation for intelligent visual signal processing, *Frontiers in Neurorobotics, Volume 16, Article 1054481, 2022 [IF: **2.8**, SCI]*
7. Rani Kumari, Dinesh Kumar Sah ✉ et.al
   Automatic graph construction and Exploring different types of LSTMs for Asian Hindi languages for Medical review Sentiment Analysis,
   *ACM Transactions on Asian and Low-Resource Language Information Processing Sep 2023., [IF: **1.8**]*
8. Korhan Cengiz, Rani kumari, Dinesh Kumar Sah ✉ et.al,
   SOHCL-RDT: A self-organized hybrid cross-layer design for reliable data transmission in wireless network, *Physical Communication [IF: **2.2**]*

Under Review

1. Lightweight Edge-Generative-AI based Yawning Detection for Early Alert in Intelligent Transposition (Under review in IEEE transaction on Consumer Electronics, Impact factor= 10.9)
2. Rice Grain Image Classification Using Convolutional Neural Networks (Under review)
   Please visit the link for see the running architecture. http://34.55.57.104:8050/?user=Rani

Conferences

1. **Rani Kumari ✉, Ida-Maria Sintorn et al.**,
   Accepted: Investigating Performance and Key Factors for Grain Image Classification Using CNNs, *Northern Lights Deep Learning Conference (NLDL-2025), Organized by UiT Machine Learning group, The Arctic University of Norway and Visual Intelligence.*
2. **Rani Kumari ✉, et al.**,
   Optimizing Resource Utilization using Vector Databases in Green Internet of Things, *IEEE Global Communications Conference (GlobeCom-2023).*
3. **Rani Kumari ✉, Abhijit Mustafi**,
   Denoising of Images Using FFT, *2022 2nd International Conference on Emerging Frontiers in Electrical and Electronic Technologies, IEEE, Pages: 1–6.*
4. **Rani Kumari ✉, Abhijit Mustafi**,
   Embedding Image Watermarks in Carrier Images Using the Fractional Fourier Transform, *Test Engineering & Management (TE & M), ICPC, Pages: 25741–25751, 2020.*

Experience in Sponsored Projects:

o Promotion of University Research and Scientific Excellence 2022
  - Principal Project Implementer: Dr. Abhijit Mustafi
  - Total Amount Sanctioned: $1.1 Million, Funded under a special call from the DST.
o 360-degree Health Monitoring of Miners and Mining Community of CCL
  - Co-Principal Investigator: Dr. Abhijit Mustafi
  - Total Amount Sanctioned: $40,000, Sponsored under the CSR Initiative of CCL.
o Investigation of document clustering using nature-based algorithms in an optimized vector space, Sponsored as part of the BIT Seed Money Scheme.

Professional Services

o **Guest speaker:** Women in Data Science Worldwide guest speaker for workshop in Finland

   Reviewer Services

o **Active Reviewer** for International Journal of Communication Systems, ACM transaction on sensor network, ACM Transactions on Asian and Low-Resource Language Information Processing, IEEE transaction on consumer electronics, International Journal of Communication Systems, International Journal of Network Management, KSII Transactions on Internet and Information Systems, American Journal of Engineering and Applied Sciences, Computer communication, etc.

o **Active Member** in IEEE Computer Society, IEEE Communications Society and IEEE Signal Processing Society

Technical training

o 2023: Certification on Machine Learning using Python (MOOCs through Coursera).
o 2012: Certified Associate-CCNA (Awarded by Cisco).
o 2013: Certified Asp.net (Awarded by NIIT).

References

o **Recent Manager: Prof. Ida-Maria Sintorn**, Professor, Department of Information Technology; Vi3; Image Analysis, **Uppsala University**, Sweden. **Email:** `ida.sintorn@it.uu.se`

o **Ph.D. Supervisor: Dr. Abhijit Mustafi**, Associate Professor, Head of Department, Computer Science and Engineering, Birla Institute of Technology (BIT), Mesra, India. **Email:** `abhijit@bitmesra.ac.in`
  URL: `https://shorturl.at/hkGHR`

o **Prof. Praveen Kumar Donta:** Associate Professor, Department of Computer and System Science, **Stockholm University**, Stockholm, Sweden. **Email:** `praveen@dsv.su.se`
  URL: `https://www.su.se/english/profiles/prdo2937-1.742888?open-collapse-boxes=body-research`