Dr. Rani Kumari

About me:

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.

Technical competencies:	*****
Programming	****
Server	***
Image Processing	****
Machine learning	****
Deep Learning	****
Medical Image Analysis	**
TensorFlow	***
NLP	**

Contact Details

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Google Scholar

Currently Employed:

May-2024-Present Researcher at VI3 Division Uppsala University, Sweden Working in Sponsored Projects from Lantmännen

Responsibilities:

- Developing deep learning models based on transfer learning (Imagenet) for image classification tasks.
- 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:

Years		CGPA
2018 – 2023	Ph.D. in Computer Science Birla Institute of Technology, Ranchi, India	8.00/10
Thesis Title:	Optimizing Digital Image Watermarking in the Fractional Fourier Domain Using Metaheuristic Approaches	
2014 – 2016	MTech. in Computer Science Maulana Abul Kalam Azad University of Technology, Kolkata, India	6.88/10
Thesis Title:	The Power of Biometric Indicators: Leveraging Physiological Signals to Detect and Analyse Emotions	
2010 – 2014	B.Tech. in Computer Science National Institute of Science and Technology, Berhampur, Odisha, India	7.87/10
Project Title:	The Fastest Data Backup Tool on Android: Super Backup	
2007 – 2009	Senior secondary (Science) KTI College, Ranchi, India	60.4%

Skills:

Languages:	Strong reading, writing and speaking competencies for English and Hindi.
Coding	Python, C, C++, Core Java, MATLAB
Framework	TensorFlow used for image classification using transfer learning
libraries	NumPy, Pandas, MatplotLib, Scikit-Learn,
Expertise	Image and signal processing, Computer vision Machine/Deep learning, and Heuristic algorithms.
Technology	Html, Flask, JavaScript, Apache Web Server.
Databases	MySQL, PostgreSQL

Research Publications:

Journals publication details:

1. Debendra Muduli, *Rani Kumari et al.*

   Retinal Imaging based Glaucoma Detection using Modified Pelican Optimization based Extreme Learning Machine, Scientific Reports, Nature Publishing, Impact Factor: **3.8 SCI**

2. *Rani Kumari et al.*

   Advancing Medical Recommendations with Federated Learning on Decentralized Data: A Roadmap for Implementation

   IEEE Transactions on Consumer Electronics, IEEE, 2023, Impact Factor: **4.414 SCI**

3. *Rani Kumari 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, ACM, 2023, Impact Factor: **2.0 SCI**

4. *Rani Kumari et al.*

   Acoustic signal-based indigenous real-time rainfall monitoring system for sustainable environment

   Sustainable Energy Technologies and Assessments, Elsevier, Volume: 60, Pages: 103398, 2023, Impact Factor: **8.84 SCI**

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, Impact Factor: **3.1 SCI**

6. Kumari, Rani, and Abhijit Mustafi.

   The spatial frequency domain designated watermarking framework uses linear blind source separation for intelligent visual signal processing.

   Frontiers in Neurorobotics 16 (2022): 1054481. Impact Factor**: 2.6 SCI**

7. Cengiz, Korhan, Kumari, Rani, et al.

   SOHCL-RDT: A self-organized hybrid cross-layer design for reliable data transmission in wireless network. *Physical communication* 60 (2023): 102132. Impact Factor**: 2.0 SCI**

Under Review details:

1. Wavelet-Attention Features and TCO-Optimized SVM based XAI approach for Brain Tumor Detection (Nature scientific report)
2. Lightweight Edge-AI for Smart Consumer Devices: A Case Study on Yawning Detection IEEE Transactions on Consumer Electronics
3. Investigating Performance and Key Factors for Grain Image Classification Using Convolutional Neural Networks (Nature scientific report)

Conference publication details:

1. Rani Kumari, Ida-Maria Sintorn et al. **Investigating performance and key factors for grain image classification using CNNs** Northern Lights Deep Learning Conference (NLDL-2025), Accepted, Organized by UiT Machine Learning group, UiT 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 (GlobCom-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:

1. **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**.
2. **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**.
3. **Investigation of document clustering using nature-based algorithms in an optimized vector space,** Sponsored as part of the **BIT Seed Money Scheme**.

Certifications:

1. **2023**: Certification on Machine Learning using Python (MOOCs through Coursera).
2. **2012**: Certified Associate-CCNA (Awarded by Cisco).
3. **2013**: Certified Asp.net (Awarded by NIIT).

References:

1. **Prof. Ida-Maria Sintorn** (Current manager at Uppsala University)
   - Professor, Department of Information Technology; Vi3; Image Analysis, Uppsala University, Sweden.
   - Email: ida.sintorn@it.uu.se
2. **Dr. Abhijit Mustafi** (Ph. D Supervisor)
   - Associate Professor, Head of department, Computer Science and Engineering, Birla institute of technology (BIT), Mesra, India.
   - Email: abhijit@bitmesra.ac.in, Website: https://shorturl.at/hkGHR

3. **Anders Hast**
    - Professor at Department of Information Technology; Vi3; Image Analysis
    - E-mail: anders.hast@it.uu.se
    - Website: https://www.uu.se/en/contact-and-organisation/staff?query=N7-18
4. **Dr. Praveen Kumar Donta**
    - Associate Professor, Department of Computer and System Science, Stockholm University, Stockholm, Sweden.
    - Email: praveen.donta@dsv.su.se
    - Website: http://praveend.in/