# Usma Niyaz

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## Interests

Medical Image Analysis, Model Compression, Knowledge Distillation, Deep Learning, Machine Learning, and Computer Vision

## Education

**IIT Ropar** — Punjab, India
PhD Computer Science & Engineering — currently
GPA: *8.07*

**Central University of Jammu** — J&K, India
Master of Technology (M.Tech.) Computer Science & Technology
GPA: *8.92* — 2016 - 2018

**University of Kashmir** — J&K, India
Bachelor of Technology (B.Tech.) Computer Science & Engineering *81.6%* — 2011 - 2015

## Teaching Experience

**Assistant Professor(Contractual), Department of Computer Science and Engineering, NIT Srinagar, India** — Sept 2018- Dec 2018

**Assistant Professor(Contractual), Department of Information and Technology, NIT Srinagar, India** — March 2019-2020

## Ph.D Courses — Grade Points

| | |
|---|---|
| **Artifical Intelligence** | 9 |
| **Machine Learning** | 8 |
| **Artifical Neural Networks** | 8 |
| **Advanced Computer Vision** | 9 |
| **Digital Image Processing and Analysis** | 7 |

## Teaching Assistant

Artificial Neural Networks (CS504), Optimization for Machine Learning (CS560), Programming Paradigms & Pragmatics (CS202), Computer Graphics (CS515), Digital Image Processing & Analysis (CS517), Data Structures and Algorithms (CS506)

## Add-on Courses

**Computer Vision** — Stanford (2018)
**Machine Learning - Stanford** — Coursera (2017)

## Journal Publications

**SHAPER: Shape-aware Parameter-Efficient Representation Learning for Medical Image Segmentation**
***Usma Niyaz**, Abhishek Singh Sambyal, Ranjana Roy Chowdhury, Deepti R. Bathula*
Knowledge Based Systems (SCI; IF: 7.6), 2026

**Prototypical Aggregate Network - Boosting Few-Shot Learning for Medical Image Classification**
*Ranjana Roy Chowdhury, **Usma Niyaz**, Deepti R. Bathula*
Multimedia Tools and Applications (SCI; Q1), 2026.

**MRI-to-PET Cross-Modality Translation using Globally & Locally Aware GAN (GLA-GAN) for Multi-Modal Diagnosis of Alzheimer's Disease**
*Apoorva Sikka, Skand Peri, Jitender Singh Virk, **Usma Niyaz**, Deepti R. Bathula*
The Journal of Precision Medicine: Health and Disease, 2025

**Leveraging Different Learning Styles for Improved Knowledge Distillation in Biomedical Imaging**
***Usma Niyaz**,Abhishek Singh Sambyal, Deepti R. Bathula*
Computers in Biology and Medicine (SCI; IF: 7.7), 2024

**Understanding Calibration of Deep Neural Networks for Medical Image Classification**
*Abhishek Singh Sambyal, **Usma Niyaz**, Narayanan C. Krishnan, Deepti R. Bathula*

Computer Methods and Programs in Biomedicine (SCI; IF: 6.1), 2023

## Conference Publications

**ShapeDistill: Shape-Constrained Knowledge Distillation for Medical Segmentation**
***Usma Niyaz**, Deepti R. Bathula*
18th International Conference on Machine Vision (ICMV), 2025.

**Dual-Level Adaptive Sampling for Enhanced Few-Shot Medical Image Classification**
*Ranjana Roy Chowdhury, **Usma Niyaz**, Deepti R. Bathula*
7th IEEE Symposium on Computers & Informatics (ISCI), 2025)

**LS+: Informed Label Smoothing for Improving Calibration in Medical Image Classification**
*Abhishek Singh Sambyal, **Usma Niyaz**, Deepti R. Bathula*
27th International Conference on Medical Image Computing and Computer Assisted Intervention,(MICCAI), 2024

**Wavelet-Based Feature Compression for Improved Knowledge Distillation**
***Usma Niyaz**, Abhishek Singh Sambyal, Deepti R. Bathula*
IEEE 21st International Symposium on Biomedical Imaging (ISBI), 2024

**Class-Wise Feature Map Selection Based Prototypical Networks**
*Ranjana Roy Choudhary, **Usma Niyaz**, Deepti R. Bathula*
IEEE 21st International Symposium on Biomedical Imaging(ISBI) Satellite Worshop, 2024

**Augmenting Knowledge Distillation with Peer-to-Peer Mutual Learning for Model Compression**
***Usma Niyaz**, Deepti R. Bathula*
IEEE 19th International Symposium on Biomedical Imaging (ISBI), 2022

**Evaluation of Deep Learning model with Optimizing and Satisficing metrics for Lung Segmentation**
***Usma Niyaz**, Abhishek Singh Sambyal, Devanand*
International Conference on Soft Computing for Problem Solving (SocProS), 2018

**Advances in Deep Learning Techniques for Medical Image Analysis**
***Usma Niyaz**, Abhishek Singh Sambyal, Devanand*
IEEE International Conference on Parallel, Distributed and Grid Computing (PDGC), 2018

## Reviewer

Medical Image Computing and Computer Assisted Intervention (MICCAI), International Symposium on Biomedical Imaging (ISBI) Computers in Biology and Medicine, Knowledge Based Systems, Computers and Electrical Engineering, Computer Vision & Image Processing (CVIP)

## Collaboration

**Mom2b**: Predicting peripartum depression using a smartphone application and digital phenotyping, Uppsala University, Sweden

## Conferences/Symposium/Workshops

**18th International Conference on Machine Vision 2025**
Paris, France
19-22 October 2025

**8th International Conference on Data Science and Management of Data (CODS-COMAD)**
IIT Jodhpur, India
18-21 December 2024

**27th International Conference on Medical Image Computing and Computer Assisted Intervention,(MICCAI) 2024**
Marrakesh, Morocco
6-10 October 2024

**21st IEEE International Symposium on Biomedical Imaging (ISBI) 2024**
Athens, Greece
27-30 May 2024

**The Indian Symposium on Machine Learning (IndoML) 2023**

IIT Bombay, Maharastra, India
21-23 December 2023

**19th IEEE International Symposium on Biomedical Imaging (ISBI) 2022**
ITC Royal Bengal, Kolkatta, India
28-31 March 2022

**24th International Conference on Medical Image Computing and Computer Assisted Intervention,(MICCAI) 2021.**
27th September - 1st October 2021

**Google Research India-Graduate Symposium 2021**
7-10 April 2021

**8th International Conference on Soft Computing for Problem Solving (SocProS) 2018**
Vellore Institute of Technology Vellore, India
17-19 December, 2018

**5th International Conference on Parallel, Distributed and Grid Computing (PDGC) 2018**
Solan Himachal Pradesh, India
20-22 December, 2018

**International Conference on Recent Innovations in Computing (ICRIC 2018)**
Central University of Jammu
05 - 06 March, 2018

**Workshop: Recent Trends in Computer Technology 2018**
Central University of Jammu
21 - 28 October, 2018

## Projects

**Lung Segmentation** *[Python]*
In the Kaggle competition "*Finding and Measuring Lungs in CT Data*," we proposed a novel CNN-based architecture called FastSegmentation (FS). Unlike traditional architectures such as U-Net, FS eliminates skip connections, focusing on efficient evaluation of deep learning models with optimizing and satisfisfying performance metrics for lung segmentation.

**Lung Cancer Detection using CNN** *[Python]*
For my M.Tech. project, I designed and implemented a method for lung cancer classification by analyzing thousands of CT scan images. This approach utilized a Convolutional Neural Network (CNN) architecture, which was developed from scratch, to achieve accurate and reliable results..

**Copy At Once** *[C#]*
Developed a Windows application designed to copy files and folders simultaneously to all connected removable devices. The application aimed to save time by overcoming the default Windows limitation, which allows file transfers to only one drive at a time.

**Traffic Analysis System for Smart Cities** *[Arduino]*
The project focused on implementing a method for detecting and analyzing traffic jams on roads by establishing a network of interconnected vehicles. This approach enabled real-time traffic monitoring and analysis to improve road efficiency and reduce congestion.

## Projects Guided

**Twitter bot detection** *[Python]*
Developed a machine learning-based approach for detecting bot accounts using the Naive Bayes algorithm. The project focused on analyzing account behaviors and patterns to accurately distinguish between genuine users and bots.

**Violence Detection Using Deep Learning** *[Python]*
Designed and developed a technique for the automatic analysis of surveillance videos to detect the presence of violence. The approach leveraged 3D Convolutional Neural Networks (3D CNNs) to capture spatial and temporal features, enabling accurate identification of violent activities in real-time video streams.

**Vehicle Simulation and Object detection in Gaming Environment(Phase I)** *[Python]*
Developed a simulation for a vehicle that simultaneously detects lanes and objects on the road. The system integrates advanced computer vision techniques to identify lane markings and objects in

real-time, enabling enhanced navigation and safety features for autonomous vehicles. The project is still in Phase 1

## Achievements

1. **Society of Women Engineers (SWE)** Received scholarship for the 2025–2026 academic year.
2. **Anusandhan National Research Foundation (ANRF) Travel Grant (formerly SERB)** Awarded the travel grant to present my paper at the 21st IEEE International Symposium on Biomedical Imaging (ISBI) 2024.
3. **ISBI Travel Grant** Received the travel grant to attend 21st IEEE International Symposium on Biomedical Imaging (ISBI) 2024.
4. **Lead, "Pehachaan Ek Safar" NGO at IIT Ropar:** Served as a Lead in the "Pehachaan Ek Safar" NGO at IIT Ropar, Punjab, India, where we teach underprivileged children and assisted them in securing admissions to government and private schools.
5. **Gate Qualified:** Successfully qualified the Graduate Aptitude Test in Engineering (GATE) 2020.
6. **Best Paper Presentation Award, ICRIC 2018:**
7. **Best Paper Award, SOCPROS 2018:**
8. **National Mobile Championship - RoboMania2013:** Qualified the prelims round in the National Mobile Championship "RoboMania2013" held at the Islamic University of Science and Technology, organized by Robonext.
9. **Skill Development Programme on CCNA, University of Kashmir:** Successfully completed a 2-month Skill Development Programme on CCNA organized by the Entrepreneurship Development Cell (EDC) at the University of Kashmir.

## Mailing Address

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