

SNEHA SHUKLA

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EDUCATION

Indian Institute of Technology Indore <i>Ph.D. in Computer Science and Engineering</i>	<i>May 2021 - Nov 2025</i> <i>CPI: 8.91/10</i>
National Institute of Technology Raipur <i>M.Tech. in Information Technology</i>	<i>Jul 2016 - Jul 2018</i> <i>CPI: 8.32/10</i>
Chhattisgarh Swami Vivekananda Technical University, Bhilai <i>B.E. in Electronics and Telecommunication</i>	<i>Aug 2011 - Jun 2015</i> <i>CPI: 8.66/10</i>

RESEARCH

Enhancing Adversarial Robustness of Medical Image Segmentation	<i>Apr 2024 - Feb 2025</i>
– Proposed a novel adversarial defence method that leverages contrastive and multitask learning.	
– The proposed method effectively mitigates the impact of adversarial attacks on the medical image segmentation model by reducing the attack success rate up to less than 10%.	
Detection of anomaly samples in Medical Image Segmentation	<i>Apr 2023 - Mar 2024</i>
– Designed a novel detection method that distinguishes adversarial and OOD samples from clean samples by employing the consistency analysis between input and input variants.	
– This marks the first unified method devised for medical image segmentation tasks, delivering a significant detection success rate.	
Trustworthy Medical Image Segmentation Models	<i>Apr 2022 - Mar 2023</i>
– Devised an innovative approach to assess and improve the trustworthiness of medical image segmentation models, enhancing their overall effectiveness.	
– The method outperforms the state-of-the-art medical image segmentation models by providing improved segmentation outcomes.	
Adversarial Attacks on Medical Image Segmentation Models	<i>Sep 2021 - Mar 2022</i>
– Proposed a novel attack architecture that selects the best surrogate loss function to perform attacks on medical image segmentation models while adding minimum adversarial perturbations.	
– The architecture was able to fool the state-of-the-art medical image segmentation models with an attack success rate of more than 99%.	
Heart rate monitoring from face videos using deep learning	<i>Jan 2021 - Jul 2023</i>
– Developed a healthcare framework for heart rate monitoring using remote photoplethysmography (rPPG) from non-contact face videos captured by camera sensors.	
– The experimental results demonstrate that the proposed method outperforms state-of-the-art rPPG-based methods on publicly available datasets.	

PUBLICATIONS

- **Sneha Shukla**, Anup Kumar Gupta, Puneet Gupta, “Exploring the feasibility of Adversarial Attacks on Medical Image Segmentation”, *Multimedia Tools and Applications*, Springer, (2024), DOI: <https://link.springer.com/article/10.1007/s11042-023-15575-8>.
- **Sneha Shukla**, Lokendra Birla, Anup Kumar Gupta, Puneet Gupta, “Trustworthy Medical Image Segmentation with improved performance for in-distribution samples”, *Neural Networks*, Elsevier, (2023), DOI: <https://doi.org/10.1016/j.neunet.2023.06.047>.
- **Sneha Shukla**, Puneet Gupta, “EVADE: A Novel Method to Detect Adversarial and OOD Samples in Medical Image Segmentation”, *Expert Systems With Applications*, Elsevier, (2025), DOI: <https://doi.org/10.1016/j.eswa.2025.127319>.
- **Sneha Shukla**, Puneet Gupta “Elevating Adversarial Robustness by Contrastive Multitasking Defence in Medical Image Segmentation”, *Neural Networks*, Elsevier, (2025), DOI: <https://doi.org/10.1016/j.neunet.2025.108182>.
- **Sneha Shukla**, Puneet Gupta, Esa Rahtu “A Comprehensive Survey of Advanced Transformer-based Attentions for Computer Vision Applications”, *ACM Computing Surveys*, ACM, (2025). (Under Review)
- Lokendra Birla, **Sneha Shukla**, Trishna Saikia, Puneet Gupta, “HR-TRACK: An rPPG method for heartrate monitoring using Temporal Convolution Networks”, *International Conference on Pattern Recognition (ICPR)*, (2024). DOI: https://doi.org/10.1007/978-3-031-78201-5_24
- Lokendra Birla, **Sneha Shukla**, Anup Kumar Gupta, Puneet Gupta “ALPINE: Improving Remote Heart Rate Estimation using Contrastive Learning”, *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, (2023), DOI: <https://doi.org/10.1109/WACV56688.2023.00500>.
- Anirban Nath, **Sneha Shukla**, Puneet Gupta “MTMedFormer : Multi-Task Vision Transformer for Medical Imaging with Federated Learning”, *Medical & Biological Engineering & Computing*, Springer, (2025), DOI: <https://doi.org/10.1007/s11517-025-03404-z>.
- Mridu Sahu, Saumya Vishwal, S Usha Srivalli, **Sneha Shukla**, Sanjivani Shantaiya, “Feature extraction and analysis of overt and covert EEG signals with speller devices”, *International Journal of Advanced Intelligence Paradigms*, (2023), DOI: <https://doi.org/10.1504/IJAIP.2023.135026>.
- Mridu Sahu, Shrish Verma, Naresh K Nagwani, **Sneha Shukla**, “EEG signal analysis and classification on P300 speller-based BCI performance in ALS patients”, *International Journal of Medical Engineering and Informatics*, (2020), DOI: <https://doi.org/10.1504/IJMEI.2020.108240>.
- Mridu Sahu, **Sneha Shukla**, “Impact of Feature Selection on EEG Based Motor Imagery”, *Information and Communication Technology for Competitive Strategies*, Springer (2019), DOI: https://doi.org/10.1007/978-981-13-0586-3_73.
- Mridu Sahu, Saumya Vishwal, Srungaram Usha Srivalli, Naresh Kumar Nagwani, Shrish Verma, **Sneha Shukla**, “Applying Auto-Regressive Model’s Yule-Walker Approach to Amyotrophic Lateral Sclerosis (ALS) patients’ Data”, *Current Medical Imaging*, (2019), DOI: <https://doi.org/10.2174/1573405614666180322143503>.

WORK EXPERIENCE

Indian Institute of Technology, Indore
Teaching Assistant, Department of Computer Science and Engineering

Indore, Madhya Pradesh, India
May 2021 - Dec 2024

- Machine Learning (CS 403/603)
- Computer Vision (CS 419/619)
- Computer Programming (IC 151)
- Cryptography and Network Security (CS 417/617)

Indian Institute of Technology, Indore
Project Research Scholar

Indore, Madhya Pradesh, India
Jan 2021 - Jul 2023

- Worked on the CPS-Drishti sponsored project titled “*Designing remote PPG based Heart rate estimation system for face mask videos.*”
- Worked on the SERB-DST sponsored project titled “*Heart rate monitoring from non-contact face videos using deep learning.*”

National Informatics Centre (NIC)
Research Programmer, Department of School Education

Raipur, Chhattisgarh, India
Jul 2018 - Dec 2019

- Designed a deep learning-based speech recognition system to tackle the pronunciation problem in the English language under the state education research and development project.

POSITION OF RESPONSIBILITIES

- **Mentorship:** Supervised 2 undergraduate and 3 post-graduate students in their projects.
- **Coordinator:** Symposium 2.0, a 3-day annual technology event organised by the Department of CSE, IIT Indore.
- **Coordinator:** SERB-sponsored Karyashala event, a 7-day high-end workshop organised by the Deep Intelligence Lab, Department of CSE, IIT Indore.
- **Affiliate Member:** Cyber-Physical System Drishti Club, a Technology Innovation Hub at IIT Indore.

EXTRACURRICULAR ACTIVITIES

- Actively participated in IIT Indore’s computer education awareness program, providing government school students with insights into recent technologies and career guidance.
- Designed the departmental logo and t-shirts for the Department of CSE at IIT Indore.
- Contributed to the paper-bag distribution program to raise awareness against the use of polythene bags, organised by the AVANA club (a social welfare initiative) at IIT Indore.
- Participated in the workshop on *Medical Signal and Image Processing* organised by the Department of CSE, NIT Raipur.
- Achieved pre-senior and senior general knowledge test certificates with a score of 90% in both.
- Awarded running shields for achieving the highest grades in mathematics.