Dr. Sana Rao

Address: Department of Information and Communication Technology, BZU, Multan

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Profile:

Ph.D. from Xiamen University, China. Highly self-motivated candidate with demonstrated research expertise growing in Computer Vision.

Research Interest:

- Variational methods
- Motion Estimation
- Motion Segmentation
- Multimedia
- Model fitting

Skills:

- MATLAB for Computer Vision (to estimate and segment motion)
- Model fitting by statistical methods
- Optical flow estimation
- Quantitative analysis for motion (Angular error calculation, End point error calculation)
- Trained for documentation practices and scientific research paper writing
- Web development

Achievements and Awards:

- HEC Approved Supervisor
- HEC Approved Reviewer
- CSC Scholarship awarded for Ph.D. in Computer Science (2017/Sep-2022).
- Partial Scholarship awarded by NMG for Nanjing University of Science and Technology, 2014-2017.
- Entrepreneur first position awarded by Bahauddin Zakariya University, Multan, Pakistan.

Education

Ph.D. **2017/Sep to 2022**

Ph.D. in Computer Science

Xiamen University, China

Dissertation: Robust Optical Flow Estimation Under Adverse Outdoor Conditions.

Research Areas:

• Computer Vision

• Motion Estimation

Publications: SCI HEC (W category) 4 papers published in International Peer reviewed journals (List at the end of CV)

Achievements:

• Chinese Government Scholarship

Master of Science in Engineering in Computer Science **2014 to 2017**

Nanjing University of Science and Technology, China

Thesis: Test suite generation from Extended Finite State Machine by Using a Search-Based Approach.

Research Area: Test case generation for systems, Finite and Extended finite state machines.

BS in Information Technology **2009 to 2013**

Bahauddin Zakariya University, Multan

Thesis: Online Election (Voting) System.

Research Experience

Research Assistant / Research Scholar **09/2017 to 06/2022**
Xiamen University, China.
Fujian Key Laboratory of
Sensing & Computing for
Smart City.
Supervisor: Prof. Hanzi
Wang
Research Focus:
Computer Vision, Optical Flow
Duties
• Resolving complex issues in efficient and effective ways.
• Experience with data representation and data analysis tools including MATLAB, GPU
• Solid understanding of Multimedia, Image processing, Motion analysis, Variational methods, Statistical models, Outdoor environmental condition analysis.
• Solid understanding of computer vision and multimedia algorithms and techniques.
• Experience with deep learning and machine learning methods for motion estimation.

Teaching Experience

Assistant Professor **09/2025 to Present**
Department of Information &
Communication Technology,
Bahauddin Zakariya University,
Multan.

Lecturer **04/2023**
Department of Computer
Science
Virtual University of Pakistan,
Multan Campus.

Lecturer (visiting faculty) **02/2022 to 07/2022**
Department of Information
Technology
Bahauddin Zakariya University,
Multan.

Industry Experience

Center to Advance Level Research and Development (SMC-PVT) Ltd **01/2022 – 04/2023**
Multan, Punjab, Pakista
Job Title: Research Lecturer

Key Responsibilities:
• Collaboration with public & private sector research groups.
• Research and Development Seminars.
• Identifying, developing, and directing the implementation of business strategy.
• Promoting and facilitating leading-edge research, including collaborative and interdisciplinary research, in areas related to the goals of the organization.
• Building, and providing sufficient support for, a community of innovative researchersto enhance research capacity at partner organizations/ universities and to increase internal and external research.
• Developing networks between the research center and researchers in the field in the public and private sectors, locally, nationally and internationally.
• Transferring knowledge to society through outreach (e.g., collaborative research; seminars; workshops; lectures;

websites; publications) and, where applicable, through technology transfer (e.g., collaborative research; contract work).

Projects:

- Pakistan 100 Research & Development Seminars for Undergraduate Students.
- Communication Technology Research Center (CTRC).

Publications

❖ HEC (W) category SCI Journal Publications

Paper	IF
• Sana Rao, Hanzi Wang, Rao Kashif, Faiza Rao, "Robust optical flow estimation to enhance behavioral research on ants", **Digital Signal Processing. (2022)**	2.92/ W category
• Sana Rao, Hanzi Wang, "Robust optical flow estimation via edge preserving filtering", **Signal Processing: Image Communication. (2021)**	3.45/ W category
• A framework for robust motion estimation and segmentation in adverse outdoor conditions", **Multimedia Tools and Applications**. **(2021)**	3.00/ W category
• Sana Rao, Hanzi Wang, "Optical Flow Estimation via Weighted Guided Filtering with non-local Steering Kernel", **Visual Computer. (2022)**	3.00/ W category
• Aymon Malik, Faiza Rao, Romesa Rao, and Sana Rao*, "Assessing Breast Cancer awareness and knowledge in Multan, Pakistan: Development of a Bilingual mobile application for early detection", **Bioscience Research. (2024)**	0.73/Y

❖ National and International Conference Papers

• Sana Rao, and Kashif Rao. "Robust Optical Flow Estimation for Wilted Plant Leaves Motion: Predicting Water-Stressed and Well-Watered Conditions." International Conference on Progress in Informatics and Computing (PIC). IEEE, 2024. **(Oral Presentation)**
• Kashif Rao, and Sana Rao. "Optical flow estimation technique for hazy scenes." International Conference on Digital Futures and Transformative Technologies (ICoDT2). IEEE, 2022. **(Oral Presentation)**
• Sana Rao, Rao Kashif. "Optical Flow Estimation Techniques for Outdoor Surveillances: An Overview". International Conference on Social Sciences and information Technology for Sustainable Social Development (ICoSS&IT). 2021. **(Oral Presentation)**
• Sana Rao, Hosney Jahan, Dongmei Liu."A Search-Based Approach for Test Suite Generation from Extended Finite State Machine". International Conference on Progress in Informatics and Computing (PIC). IEEE, 2016. **(Oral Presentation)**
• Hosney Jahan, Sana Rao, Dongmei Liu. "Test Case Generation for BPEL-Based Web Service Composition Using Colored Petri Nets". International Conference on Progress in Informatics and Computing (PIC). IEEE, 2016. (**Oral Presentation**).

❖ Reviewer in International Journals

• IEEE Access	• Advances in Science, Technology and Engineering System Journal (ASTESJ)