Rao Muhammad Umer

Research Statement

My research revolves around a broad spectrum of **image restoration**, particularly in **image super-resolution**, **image deblurring**, and **image denoising**.

Research Interests

Computational Imaging, Image Restoration, Camera pipeline, Computer Vision, Machine Learning, Deep Learning, Medical Imaging.

Education

Nov 2018 - 2021 **PhD in Industrial and Information Engineering**, *University of Udine*, Udine, Italy.
Research Area: Computer Vision and Deep Learning

Nov 2014 - 2016 **MS in Computer Science**, *Pakistan Institute of Engineering and Applied Sciences*, Nilore, Islamabad, Pakistan.
Area: Computational Intelligence and Machine Learning
Cgpa: 3.45/4.0, ranked in top 5% of the class.

Sep 2010 - 2014 **BSc. in Computer Systems Engineering**, *The Islamia University of Bahawalpur*, Bahawalpur, Pakistan.
Major Subjects: AI, Parallel and Distributed Computing, Image Processing
Cgpa: 3.82/4.0, ranked in top 5% of the class.

Sep 2008 - 2010 **FSc. in Pre-Engineering**, *Government Post Graduate College*, Sahiwal, Pakistan.
Major Subjects: Mathematics, Physics, Chemistry
Percentage average: 86%, 943/1100 Marks.

Mar 2006 - 2008 **Matriculation in Science**, *Lasani Public High School*, Sahiwal, Pakistan.
Major Subjects: Mathematics, Physics, Chemistry, Biology
Percentage average: 92%, 783/850 Marks.

Professional Experience

Sep 2018 **Research Fellow**, *Computational Imaging Group (CIG)* at the Skolkovo Institute of Science and Technology, Moscow, Russia.

Nov 2016 - 2017 **Lecturer**, *Department of CS & IT, The University of Lahore*, Lahore, Pakistan.
Taught courses: • Computer Vision, • Data Structures and Algorithms, • Digital Logic Design, • Business Computing, • Programming Fundamentals - I, • Introduction to Information and Communication Technologies.
Note: All taught courses materials are available at: https://raoumer.github.io/courses.html

Given Seminars

May 2020 Deep Neural Networks for Super-Resolution, *Deep Learning and more for Computer Vision Applications seminar*, Universit Politecnica delle Marche (UNIVPM), Italy.

Aug 2016 Deep Learning & GPUs, *Introduction to DNNs workshop*, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad, Pakistan.

Feb 2016 Implementation of Linear Regression and Multi-variate Regression on GPU using Cuda C/C++, *GPU Computing workshop*, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad, Pakistan.

Research Publications

SPLITECH 2021 — **Rao Muhammad Umer**, Asad Munir, and Christian Micheloni. "*A Deep Residual Star Generative Adversarial Network for multi-domain Image Super-Resolution*". In proceedings of the 6th International Conference on Smart and Sustainable Technologies, Sept. 08–11, 2021, Croatia.

CVPR 2021 — Goutam Bhat, Martin Danelljan, Radu Timofte, and others. "*NTIRE 2021 Challenge on Burst Super-Resolution: Methods and Results*". In proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, June 19–25, 2021, USA.

ICPR 2020 — **Rao Muhammad Umer**, Gian Luca Foresti, and Christian Micheloni. "*Deep Iterative Residual Convolutional Network for Single Image Super-Resolution*". In proceedings of the IEEE International Conference on Pattern Recognition (ICPR), Jan 10–15, 2021, Italy.

ECCV 2020 — **Rao Muhammad Umer**, and Christian Micheloni. "*Deep Cyclic Generative Adversarial Residual Convolutional Networks for Real Image Super-Resolution*". In proceedings of European Conference on Computer Vision (ECCV) Workshops, August 24–28, 2020, UK.

ECCV 2020 — Pengxu Wei, Hannan Lu, Radu Timofte, Liang Lin, Wangmeng Zuo, and others. "*AIM 2020 Challenge on Real Image Super-Resolution: Methods and Results*". In proceedings of European Conference on Computer Vision (ECCV) Workshops, August 24–28, 2020, UK.

ECCV 2020 — Kai Zhang, Martin Danelljan, Yawei Li, Radu Timofte and others. "*AIM 2020 Challenge on Efficient Super-Resolution: Methods and Results*". In proceedings of European Conference on Computer Vision (ECCV) Workshops, August 24–28, 2020, UK.

CVPR 2020 — **Rao Muhammad Umer**, Gian Luca Foresti, and Christian Micheloni. "*Deep Generative Adversarial Residual Convolutional Networks for Real-World Super-Resolution*". In proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, June 14–19, 2020, USA.

CVPR 2020 — Andreas Lugmayr, Martin Danelljan, Radu Timofte, and others. "*NTIRE 2020 Challenge on Real-World Image Super-Resolution: Methods and Results*". In proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, June 14–19, 2020, USA.

ICDSC 2019 — **Rao Muhammad Umer**, Gian Luca Foresti, and Christian Micheloni. "*Deep Super-Resolution Network for Single Image Super-Resolution with Realistic Degradations*". In 13^{th} International Conference on Distributed Smart Cameras (ICDSC), Sept. 9-11, 2019, Trento, Italy.

PIEAS 2016 — **Rao Muhammad Umer**. "*Deep Web Extractor (DWX): Content Discovery From Deep Web Using Large Scale Data Analytics Paradigm*". MS Thesis, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad, Pakistan.

IUB 2014 — **Rao Muhammad Umer**. "*Spam Filtering System: Malicious Email Detection and Filtering System Using Bayesian Machine Learning Algorithm*". Technical Report, The Islamia University of Bahawalpur (IUB), Bahawalpur, Pakistan.

AI Summer Schools

Aug 2021	Oxford Machine Learning Summer School, (Virtual) in August 9–20, 2021, at University of Oxford, UK.
Jun 2019	AI-DLDA 2019 International Summer School on Artificial Intelligence, in June 3–7, 2019, at University of Udine, Italy.

Honors and Awards

Nov 2018 - 2021	**PhD Fellowship**, *sponsored by Italian Govt. for PhD studies.*
Oct 2016	**Best MS Thesis Award**, *from Department of Computer and Information Sciences, PIEAS, Islamabad, Pakistan.*
Nov 2014 - 2016	**PIEAS Fellowship by PIEAS IT-Endowment Fund**, *sponsored by Higher Education Commission(HEC) for MS Computer Science.*
Sep 2010 - 2014	**Fully Funded National ICT Scholarship**, *by National ICT R & D Fund for BSc. Computer Systems Engineering.*
Jun 2011 - 2014	**Position Scholarship**, *by University College of Engineering and Technology, The Islamia University of Bahawalpur for excellent academic performance throughout undergraduate degree.*
Sep 2010 - 2014	**Merit Scholarship**, *by Punjab Educational Endowment Fund(PEEF) for excellent academic performance in higher secondary school examination.*
Sep 2008 - 2010	**Merit Scholarship**, *by Multan Board of Intermediate and Secondary Education for excellent academic performance in secondary school examination.*
Mar 2006 - 2008	**Merit Scholarship**, *by Multan Board of Intermediate and Secondary Education for excellent academic performance in District level school examination.*

Skills

Languages	• Native: Urdu, Punjabi	• English: Fluent
Hobbies	• Cricket, Running	• Reading World History
Programming	Python, C/C++, Java, MATLAB.	
Scientific Software	Pytorch, Cuda C/C++, Numpy, Scikit-learn, OpenCV, Flask, Git, Latex.	
Computer Skills	Experienced in managing Linux and Windows systems.	