

# Usman Ali, Ph.D.

COMPUTER VISION ENGINEER

📍 31253, Cheonan, South Korea

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## Summary

- Experienced in **3D shape reconstruction, optimization** of huge 3D volume data through various techniques like weighted least squares, alternating direction minimization, majorize-minimization. Image blur detection and segmentation using **machine learning** and **deep learning**
- Excellent **communication** and **presentation skills**, 7.5 years of **teaching experience**
- **Principal investigator** of project 2021R1I1A1A01052521 funded by the 2021 Creative Challenge Research Program, NRF Korea

## Publications

### JOURNALS

- **Usman Ali**, I. H. Lee, M. T. Mahmood, "Robust regularization for single image dehazing", Journal of King Saud University - Computer and Information Sciences, 2022
- **Usman Ali**, M. T. Mahmood, "Energy minimization for image focus volume in shape from focus", Pattern Recognition, 2022
- **Usman Ali**, M. T. Mahmood, "Defocus blur segmentation using local binary patterns with adaptive threshold", CMC-Computers, Materials & Continua, 2022
- **Usman Ali**, M. T. Mahmood, "Improving defocus blur measures using robust regularization", ICT Express, 2022
- **Usman Ali**, M. T. Mahmood, "Robust focus volume regularization in shape from focus", IEEE Transactions on Image Processing, 2021
- **Usman Ali**, M. T. Mahmood, "Depth enhancement through correlation-based guided filtering in shape from focus", Microscopy Research and Technique, 2021
- **Usman Ali**, I. H. Lee, M. T. Mahmood, "Guided image filtering in shape-from-focus: A comparative analysis", Pattern Recognition, 2021
- **Usman Ali**, M. T. Mahmood, "Depth hypotheses fusion through 3D weighted least squares in shape from focus", Microscopy and Microanalysis, 2021
- M. T. Mahmood, **Usman Ali**, Y. K. Choi, "Single image defocus blur segmentation using local ternary pattern", ICT Express, 2020
- **Usman Ali**, M. T. Mahmood, "3D shape recovery by aggregating 3D wavelet transform-based image focus volumes through 3D weighted least squares", Journal of Mathematical Imaging and Vision, 2020
- M. T. Mahmood, **Usman Ali**, Y. K. Choi, "Enhancing focus measurements in shape from focus through 3D weighted least squares", Journal of the Semiconductor & Display Technology, 2019
- **Usman Ali**, Vitalii Pruks, M. T. Mahmood, "Image focus volume regularization for shape from focus through 3D weighted least squares", Information Sciences, 2019
- **Usman Ali**, M. T. Mahmood, "Analysis of blur measure operators for single image blur segmentation", Applied Sciences, 2018

### CONFERENCES

- M. T. Mahmood, **Usman Ali**, "Measuring Focus Quality in Vector Valued Images for Shape from Focus", 26th International Conference on Pattern Recognition (ICPR), 2022, (Accepted)
- **Usman Ali**, M. T. Mahmood, "3D wavelet transform-based 3D shape recovery using noisy images", 21th International Conference on Electronics, Information, and Communication (ICEIC), 2022
- **Usman Ali**, M. T. Mahmood, "Guidance-based improvement in 3D shape recovery", 6th International Conference on Consumer Electronics (ICCE)-Asia, 2021
- **Usman Ali**, M. T. Mahmood, "Enforcing spatially coherent structures for accurate 3D shape recovery", 12th International Conference on ICT Convergence (ICTC), 2021
- **Usman Ali**, M. T. Mahmood, "Combining depth maps through 3D weighted least squares in shape from focus", 18th International Conference on Electronics, Information and Communication (ICEIC), 2019
- **Usman Ali**, M. T. Mahmood, "Single image blur detection and segmentation using local ternary pattern", 13th Asia Pacific International Conference on Information Science and Technology (APIC-IST), 2018
- **Usman Ali**, M. T. Mahmood, "Depth from focus enhancement through joint filtering", 3rd ICCE-Asia, 2018
- H. M. Ashraf, Ghulam Abbas, **Usman Ali**, Saifur Rehman, "Modeling and simulation of optical current transformer using operational amplifiers", International Conference on Electrical Engineering (ICEE), 2017

## Skills

**Programming:** C, C++, Python

**Trainings:** CCNA, IPV6, GSM BSS, LTE

**Languages:** English, Urdu, Korean (basic)

**Simulation Tools:** Matlab, Cisco Packet Tracer, Wireshark, Riverbed Modeler, Xilinx, Pspice, Proteus

## Education

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### Ph.D. in Computer Engineering

KOREA UNIVERSITY OF TECHNOLOGY AND EDUCATION (KOREATECH)

Feb. 2017 - Aug. 2020

Cheonan, South Korea

- Dissertation: "Image Focus and Depth Regularization in Shape from Focus"

Supervisor: M. T. Mahmood

### Masters in Electrical Engineering

UNIVERSITY OF MANAGEMENT AND TECHNOLOGY (UMT)

Oct. 2009 - Nov. 2013

Lahore, Pakistan

### Bachelors in Electrical Engineering

UNIVERSITY OF ENGINEERING AND TECHNOLOGY (UET)

Oct. 2005 - Oct. 2009

Lahore, Pakistan

## Experience

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### Postdoc Researcher

COMPUTER SCIENCE AND ENGINEERING, KOREA UNIVERSITY OF TECHNOLOGY AND EDUCATION (KOREATECH)

Sep. 2020 - Present

Cheonan, South Korea

- Currently working on depth estimation and image dehazing with an aim to boost the performance of related computer vision applications

### Assistant Professor

ELECTRICAL ENGINEERING (EE) - UNIVERSITY OF MANAGEMENT AND TECHNOLOGY (UMT)

May. 2015 - Feb. 2017

Lahore, Pakistan

- Taught courses: Data Structures & Algorithms, Computer Networks, Microprocessor Systems, Electrical Network Analysis, Differential Equations
- Served in department committee to evaluate final year projects of graduating students
- Continually arranged student industry tours to telecommunication exchange of PTCL and power grid station of NTDC
- Advised three groups of undergraduate students in their final year projects

### Lecturer

ELECTRICAL ENGINEERING (EE) - UNIVERSITY OF MANAGEMENT AND TECHNOLOGY (UMT)

Oct. 2009 - Apr. 2015

Lahore, Pakistan

- Taught courses: C programming language, Digital Logic Design, Electric Circuits, Power Systems
- Developed labs: Computer Networks, Digital Electronic Circuits
- Conducted labs: Digital Logic Design, Signals & Systems, Communication Systems
- Participated in organizing quiz competitions for EE students each semester
- Collaborated with other members of the team to analyze and update the undergraduate curriculum. This helped in obtaining renewal of accreditation of the department from national engineering council PEC in 2011, 2012 and 2013.

## Volunteer Work

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REVIEWING ACADEMIC JOURNAL

2019-2021

- Provided review for IEEE Transactions on Image Processing (TIP), Transactions on Circuits and Systems for Video Technology (CSVT), Hindawi International Journal of Optics

REVIEWING UNIVERSITY ONLINE COURSE

Mar. 2018 - May. 2018

- Reviewed course material for online study program of Korea University of Technology and Education (Koreatech), Korea

TEACHING

Oct. 2011 - Mar. 2012

- Taught to underprivileged students at Aabroo Welfare High School, Lahore, Pakistan

## References

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