TAIMOOR TARIQ | Curriculum Vitae

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About me

Scientist/Engineer interested in human vision and computer graphics. More specifically, I work on understanding, quantifying and maximizing perceptual realism and quality (with constituents such as spatial quality, dynamic range, depth, motion and color) for real-time image/video capture (computational photography), synthesis (rendering/graphics) and display (computational display).
The long term goals I aim to push towards are:

- A comprehensive understanding of how the human visual system understands visual realism and aesthetic quality.
- Real-time immersive displays (VR/AR) that are perceptually indistinguishable from the real-world.
- Real-time cameras that can not only capture the world exactly as our eyes are seeing see it, but also subjectively understand and optimize perceived aesthetic attributes associated with the captured scenes.

Education

UNIVERSITÀ DELLA SVIZZERA ITALIANA (USI)
2020 - 2024
PhD in Computer Science
Lugano, Switzerland
Concentration: Vision Science and Computer Graphics
Mentor: Piotr Didyk

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)
2017 - 2019
MS in Electrical Engineering
Daejeon, South Korea
Concentration: Visual Computing and Machine Learning
CGPA: 4.0/4.3
KAIST Graduate Fellowship Awardee

NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY (NUST)
2013 - 2017
BS in Electrical Engineering
Islamabad, Pakistan
Concentration: Digital Systems and Signal Processing
CGPA: 3.83/4.0 (Top 3% of class)
Merit Scholarship Awardee (ranked 36th out of ~80,000 applicants for admission)

Experience

CAMERA ALGORITHMS SCIENTIST
2024 -
Apple
Cambridge, UK
Research and Development of real-time computational photography algorithms to maximize perceived image/video quality for camera capture.

RESEARCH SCIENTIST INTERN - VISION SCIENCE AND DISPLAY ALGORITHMS
10/2022 - 6/2023
Meta
Sunnyvale, California, USA
Mentors: Alex Chapiro*, Ajit Ninan, Nathan Matsuda, Douglas Lanman
Worked with the Applied Perception Science and Display Systems Research teams on perceptually optimized computational display algorithms for real-time VR. Designed an ultra-fast automatic/adaptive tone mapper (that optimally maintains perceptual appearance of HDR content after mapping) for standalone VR displays.

DOCTORAL RESEARCHER - VISION SCIENCE AND AR/VR GRAPHICS
2020 - 2024

Perception, Display and Fabrication Group - USI
Lugano, Switzerland

Mentor: Piotr Didyk

Under the mentorship of Piotr Didyk, I worked towards realizing the dream of real-time AR/VR that is perceptually indistinguishable from the visual world. After carefully understanding and investigating the many intricacies of human vision, I designed real-time rendering algorithms to preserve the perception of spatial realism, dynamic range, motion, and depth/distance in AR/VR.

GRADUATE RESEARCHER - IMAGE/VIDEO QUALITY AND ENHANCEMENT
2017 - 2019

Video and Image Computing Lab - KAIST
Daejeon, South Korea

Mentor: Munchurl Kim

Worked on teaching neural networks to perceive image/video quality the same way humans do, with a specific focus on maximizing perceptual quality for Video Restoration/Enhancement.

UNDERGRADUATE RESEARCHER
2016 - 2017

Neuro-informatics Research Group - NUST SEECS
Islamabad, Pakistan

Mentor: Awais Kamboh

Designed real-time unsupervised signal processing algorithms, and their corresponding digital architectures (using VHDL and FPGAs) for future implantable neural chips (primarily for neuro-prosthetics)

RESEARCH INTERESTS

Human Visual Perception, Computer Graphics, Computational Displays, Computational Photography, Augmented/Virtual Realities

SELECTED PUBLICATIONS

Perceptually Optimized Super Resolution
ArXiv, 2024
Volodymr Karpenko, Taimoor Tariq, Jorge Condor, Piotr Didyk

Towards Motion Metamers for Foveated Rendering
SIGGRAPH 2024 [journal]
Taimoor Tariq, Piotr Didyk

Perceptually Adaptive Real-Time Tone Mapping
SIGGRAPH Asia 2023
Taimoor Tariq, Nathan Matsuda, Eric Penner, Jerry Jia, Douglas Lanman, Ajit Ninan, Alexandre Chapiro

Noise-based Enhancement for Foveated Rendering
SIGGRAPH 2022 [journal]
Taimoor Tariq, Cara Tursun and Piotr Didyk

Why are Deep Representations Good Perceptual Quality Features?
ECCV 2020
Taimoor Tariq, Okan Tarhan Tursun, Munchurl Kim and Piotr Didyk