Atif ANWER

Postdoctoral Researcher in Computer Vision and Deep Learning applications

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Educational Background

2019 – 2022

PhD Computer Sciences / Electrical & Electronics Engineering *(Dual-Degree)*,
INSA Rouen Normandie, France & University Teknologi PETRONAS, Malaysia, *Funded by*: Agence Nationale de la Recherche (ANR) project ICUB,
Supervisors: Prof. Samia Ainouz (INSA), Asst. Prof. Naufal Bin Saad (UTP)
Thesis: Specular Highlight Detection and Adversarial Generation of Specularity-Free Images using Multi-Domain Translation Network Trained with Polarimetric Data

2016 – 2017

MSc Electrical & Electronics Engineering,
University Teknologi PETRONAS, Perak Malaysia,
Supervisor: Asst. Prof. Syed Saad Azhar Ali
Thesis: Real-time underwater 3D scene reconstruction using Kinect v2 time of flight camera

2001 – 2004

B.E. Mechatronics,
Major: Robotics, Control Systems and Image processing,
National University of Sciences & Technology (NUST), Pakistan,
Supervisor: Dr. Saeed Ur Rahman
Thesis: Development and control of Bipedal Autonomous Robot (BART)

Research Interests

- 3D Human Pose Estimation applications
- Generative AI applications
- 3D Sensing and Robotic Perception
- Semantic Segmentation and Scene Understanding
- Mobile Robot design and development

Relevance to the Applied Position

- Experienced in researching and developing diverse unsupervised and semi-supervised ML/DL systems, addressing both traditional and unconventional computer vision challenges.
- Ability to multitask effectively and deliver deep learning projects within demanding timelines.
- Strong communication, time-management and collaborative skills, and managerial experience facilitating integration with teams.
- Extensive understanding and expertise in mechatronic systems, hardware integration and data acquisition.

Professional Experience

2022 — **Machine Learning R&D Engineer**, *Apeira Technologies*, Le Creusot, France,
Research and development of deep learning algorithms for human pose estimation and posture correction, to improve cyclist performance in videos.

2022 — **Postdoctoral Researcher**, *Université de Bourgogne*, Dijon, France,
Research and development on estimating risk of cardiovascular disease from en-face OCT fundus images using deep learning. Additionally, development of software pipeline for end-to-end detection, segmentation, and analysis of Tunnelling Electron Microscopy (TEM) images of ZnO nanoparticles.

2018 – 2020 — **Freelance 3D CAD & Graphic Designer**, *Freelancer.com*
Executed multiple 3D CAD modelling and graphic design projects from concept to prototype to completion.

2015 – 2016 — **Co-Founder & CTO**, *Scifacterz*, Islamabad, Pakistan
Robotics Startup venture centred on design and of "NBE (Non-Biological Entity)" an open-source, low cost, research platform and Home Service Robot

2004 – 2016 — **Manager (Mechatronics)**, Islamabad, Pakistan
Multiple diverse industry roles involving concurrent responsibilities in Mechanical and Electronic Design research, and managerial positions.

Skills

Frameworks, Languages & Tools	Python, TensorFlow, OpenCV, MATLAB, C#, Visual Basic, YOLO (v4, v8), Rerun, Gradio
3D Modelling and Rendering	PTC Creo, Sketchup, Blender
Design and Illustration	Adobe Photoshop, Affinity Designer, Figma, Corel Draw
Misc	Git, LaTeX, Notion, WordPress, 3D Printing

Languages

Urdu	Native	
English	Fluent	*IELTS (Band 8.0)*
French	Medium	*Good Understanding, Medium Speaking*

Extra Curricular/Pro-Bono

2020 — **Administrator**, r\ComputerVision subreddit and discord server

2010 – 2011 — **Guest writer (Hardware reviewer)**, *wccftech.com*

2007 – 2012 — **Lead Server Administrator**, *Micronet Broadband Ltd.*, Islamabad, Pakistan

Select Recent Projects

Cyclist pose estimation and posture correction (2023 ⟶)

Research and development of deep learning algorithms aimed at human pose estimation and posture correction, with a focus on enhancing cyclist performance in videos from hand-held devices. Solely responsible for refining MediaPipe accuracy by transfer-learning of graph-convolutional network (GCN) and utilizing the improved pose estimates to generate accurate SMPL/SMPL-X meshes, facilitating various cycling performance calculations.

Estimating risk of cardio-vascular diseases from OCT-A images (2023 ⟶)

Comprehensive research and development project on estimating the risk of cardiovascular disease from en-face OCT fundus images. Employed a Convolutional Neural Network (CNN) architecture with EfficientNet v2 as the backbone. A journal publication of the research work has been submitted for peer-review.

Automated analysis of TEM images of nano-particles (2023 ⟶)

Creation of a robust software pipeline for end-to-end detection, segmentation, and analysis of Tunnelling Electron Microscopy (TEM) images featuring ZnO nanoparticles. Solely responsible for implementing a custom-trained YOLO v8 network and developing a customized Python user interface for seamless navigation and control of the entire end-to-end pipeline.

SpecSeg (2021-2022)

Conceived and developed a highly efficient Specular Segmentation (SpecSeg) network, structured on the U-net architecture that can detect pixels strongly affected by specular highlights with a high degree of precision.
(SpecSeg repository, Huggingface Demo)

SHMGAN (2019-2022)

PhD Research - Development of a multi-input Generative Adversarial Network (GAN) designed to produce specular-free images from a single RGB input image, eliminating the need for external labels. Specular Highlights Mitigating GAN (SHMGAN) was trained using polarimetric images obtained under uncontrolled lighting conditions and showcased adversarial network design within challenging real-world scenarios.
(SHMGAN repository)

Teaching Experience

2023 **Masters Course (MSc Health AI)**, *Image Processing*, University de Bourgogne, Département IEM (Informatique Electronique Mécanique)
University de Bourgogne, France

2022 **Undergraduate Course**, *Data Analysis and Digital Tools*, Département Informatique et technologie de l'information, INSA Rouen, France

2021 **Undergraduate Course**, *Data Analysis and Digital Tools*, Département Informatique et technologie de l'information, INSA Rouen, France

2021 **Lab Assistant**, *Soyez Acteurs du Web!*, Département Informatique et technologie de l'information, INSA Rouen, France

2019 **Teaching Assistant**, *Probability & Statistics*, Department of Electrical & Electronics Engineering, UTP, Malaysia

Publications

Atif Anwer, Samia Ainouz, Naufal M Saad, Syed Saad Azhar Ali, and Fabrice Meriaudeau. *Joint network for specular highlight detection and adversarial generation of specular-free images trained with polarimetric data*. *Neurocomputing*, 559:126769, 2023.

Clément Germanèse, Fabrice Meriaudeau, Pétra Eid, Ramin Tadayoni, Dominique Ginhac, Atif Anwer, Steinberg Laure-Anne, Charles Guenancia, Catherine Creuzot-Garcher, Pierre-Henry Gabrielle, et al. *A Retinal Oct-Angiography and Cardiovascular STAtus (RASTA) Dataset on Swept-Source Microvascular Imaging for Cardiovascular Risk Assessment*. *Data 2023, MDPI*, 2023.

Atif Anwer, Samia Ainouz, Mohamad Naufal Mohamad Saad, Syed Saad Azhar Ali, and Fabrice Meriaudeau. *SpecSeg network for specular highlight detection and segmentation in real-world images*. *Sensors*, 22(17):6552, 2022.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Meriaudeau. *Underwater 3D scanning using Kinect v2 time of flight camera*. In *Quality Control by Artificial Vision 2017 (QCAV '17), Thirteenth International Conference on*, volume 10338 (Camera and Sensing). SPIE, 2017.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Meriaudeau. *Underwater 3D Scene Reconstruction Using Kinect v2 Based on Physical Models for Refraction and Time of Flight Correction*. *IEEE Access*, 5:15960–15970, 2017.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Meriaudeau. *Underwater 3D scanning using Kinect v2 time of flight camera*. In *The International Conference on Quality Control by Artificial Vision 2017*, 2017.

Atif Anwer, Fabrice Mériaudeau, and Syed Hasan Adil. *Customized graphical user interface implementation of Kinect Fusion for underwater application*. In *2017 IEEE 7th International Conference on Underwater System Technology: Theory and Applications (USYS)*, pages 1–6. IEEE, 2017.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Mériaudeau. *Real-time underwater 3D scene reconstruction using commercial depth sensor*. In *2016 IEEE International Conference on Underwater System Technology: Theory and Applications (USYS)*, pages 67–70. IEEE, 2016.

Atif Anwer, Syed Saad Azhar Ali, and Fabrice Mériaudeau. *Underwater online 3D mapping and scene reconstruction using low cost Kinect RGB-D sensor*. In *2016 6th International Conference on Intelligent and Advanced Systems (ICIAS)*, pages 1–6. IEEE, 2016.

Atif Anwer, Asim Baig, and Rab Nawaz. *Calculating real world object dimensions from Kinect RGB-D image using dynamic resolution*. In *2015 12th International Bhurban Conference on Applied Sciences and Technology (IBCAST)*, pages 198–203. IEEE, 2015.

Achievements

2019–2020 **Graduate Assistant Scholarship**,
Universiti Teknologi PETRONAS, Malaysia

2016–2017 **Graduate Assistant Scholarship**,
Universiti Teknologi PETRONAS, Malaysia

2016–2017 **1st round favourite**,
Robot Launch 2014 (Global robotics startup competition), RoboHub.org

2011 **Winner "Intel More to the Core™ Challenge"**,
Intel™, Pakistan

2010 **Winner "CPU IQ Blogger Challenge, South Asian region"**,
Intel™, Pakistan

2009 **Member Technical Evaluation & Judges panel**,
"RoboSprint 2010", Air University, Islamabad

2003 **Winner "Best Idea Award"**,
"1st National Fire Fighting Robot Competition (FFRC)", College of EME, NUST, Pakistan

Courses & Certificates

2020 ***Francais Langue Etrangere***,
INSA Rouen, Normandie, France

2019 ***Deep Learning for Computer Vision with Python***,
Pyimagesearch.com,

2017 ***Practical Python and OpenCV***,
Pyimagesearch.com,

2016 ***Robotic Vision***,
Queens University of Technology (MOOC)

2012 ***Advanced Digital Image Processing***,
Muhammad Ali Jinnah University, Pakistan

2011 ***Computer Vision***,
Muhammad Ali Jinnah University, Pakistan

2010 ***Nonlinear Control Systems***,
Muhammad Ali Jinnah University, Pakistan

2010 ***Robust Control System***,
Muhammad Ali Jinnah University, Pakistan

2010 ***Pattern Recognition***,
Muhammad Ali Jinnah University, Pakistan

References

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