



Umair Haroon

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ABOUT ME

I am an AI/ML Engineer nearing the completion of my PhD in Computer Science at the University of Barcelona. My doctoral research focuses on 3D reconstruction and volume estimation from 2D images, leveraging point clouds, Neural Radiance Fields (NeRF), and Structure from Motion (SfM) to advance accuracy and scalability in computer vision applications. Beyond my doctoral work, I have extensive experience applying AI to various domains, including action, interaction, and anomaly detection, video summarization, object detection, and image retrieval. I have designed and deployed a diverse range of models, including CNNs, 3D-CNNs, autoencoders, recurrent networks (LSTM, GRU), and lightweight architectures optimized for edge and mobile platforms.

With a strong foundation in both research and development, I have contributed to real-time AI systems that incorporate multimodal data and embedded devices, such as Raspberry Pi and Arduino. My work integrates cutting-edge AI techniques with practical solutions in computer vision, IoT, and intelligent systems. I am passionate about exploring innovative AI approaches and applying my expertise across diverse domains and data modalities to solve emerging challenges.

EDUCATION AND TRAINING

OCT 2022 – CURRENT Barcelona, Spain

PHD IN COMPUTER SCIENCE University of Barcelona

Address 08007, Barcelona, Spain | **Website** <https://web.ub.edu/web/ub/>

MAR 2020 – FEB 2022 Seoul, South Korea

MASTER'S IN SOFTWARE CONVERGENCE Sejong University

Address 05006, Seoul, South Korea | **Website** <https://eng.sejong.ac.kr/index.do> | **Final grade** 4.33/4.5 |

Thesis A Study of Human Interaction Recognition based on Dual-Stream Sequence Learning Framework

14 SEP 2014 – 9 AUG 2018 Peshawar, Pakistan

BACHELOR'S IN COMPUTER SCIENCE Islamia College Peshawar

Address 25120, Peshawar, Pakistan | **Website** <https://icp.edu.pk> | **Final grade** 3.53/4.0 |

Thesis Raspberry Pi Based Real-Time Hand-Gestures Recognition Using Flex Sensors

WORK EXPERIENCE

 **CVUB LAB, DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE, UNIVERSITY OF BARCELONA – BARCELONA, SPAIN**

PRE-DOCTORAL RESEARCHER – 27 SEP 2022 – CURRENT

Conducting advanced research on applying state-of-the-art camera pose estimation and 3D reconstruction techniques, including Neural Radiance Fields (NeRF), Structure from Motion (SfM), and point cloud processing to refine object pose and generate accurate 3D models for realistic and precise object/food volume estimation from 2D images. This approach addresses challenges like unbounded scenes and complex geometries, enhancing scalability and accuracy for dietary applications..

 **INTELLIGENT MEDIA LAB, DEPARTMENT OF DIGITAL CONTENTS, SEJONG UNIVERSITY – SEOUL, SOUTH KOREA**
RESEARCH ASSISTANT – MAR 2020 – FEB 2022

Deep learning models implementation and analysis such as CNNs, RNNs, LSTM, GRU for different computer vision related projects including action, interaction and activity recognition, video summarization, violence and anomaly detection, and object detection.

 **DIGITAL IMAGE PROCESSING LAB, DEPARTMENT OF COMPUTER SCIENCE, ISLAMIA COLLEGE PESHAWAR – PESHAWAR, PAKISTAN**

RESEARCH ASSISTANT – APR 2017 – FEB 2020

Mainly worked on IoT devices such as; Raspberry Pi, and Arduino, with multiple sensors, multiple image processing, machine learning and deep learning techniques.

 **FENDS CONSULTANT – PESHAWAR, PAKISTAN**

CUSTOMER SERVICE REPRESENTATIVE – 18 MAY 2014 – 5 AUG 2015

Provided customer support by handling inquiries and delivering service solutions to clients efficiently.

PUBLICATIONS

2025

[VoE++: A Text-Guided Point-Cloud Framework for Food 3D Reconstruction and Volume Estimation](#)

Publisher: Computer Analysis of Images and Patterns (CAIP 2025)

2025

[VolTex: Food Volume Estimation using Text-Guided Segmentation and Neural Surface Reconstruction](#)

Publisher: CVPR 2025 workshop

2025

[Enriching Unbounded Appearances for Neural Radiance Fields](#)

Publisher: Pattern Recognition and Image Analysis (IbPRIA 2025)

2025

[VoE: A Point-cloud Framework for Food 3D Reconstruction and Volume Estimation](#)

Publisher: ArXiv

2024

[MVSBoost: An Efficient Point Cloud-based 3D Reconstruction](#)

Journal Name: CCIA 2024

2024

[VoETA: One- and Few-shot Food Volume Estimation](#)

Publisher: ArXiv

2024

[MetaFood CVPR 2024 Challenge on Physically Informed 3D Food Reconstruction: Methods and Results](#)

Publisher: ArXiv

2022

[A Multi-Stream Sequence Learning Framework for Human Interaction Recognition](#)

IEEE Transaction on Human-Machine Systems

2022

[Deep Learning Assists Surveillance Experts: Toward Video Data Prioritization](#)

IEEE Transactions on Industrial Informatics

2022

[Intelligent Dual Stream CNN and Echo State Network for Anomaly Detection](#)

Knowledge-Based Systems

2021

A Comparative Analysis of Efficient CNN-Based Brain Tumor Classification Models

Generalization with Deep Learning, pp. 259-278 (2021)

2020

Human Interaction Recognition through Skeleton Key-points Estimation

The 6th International Conference on Next Generation Computing 2020

2018

Raspberry Pi Based Real-Time Hand-Gesture Recognition Using Flex Sensors.

The 4th International Conference on Next Generation Computing 2018

● **HONOURS AND AWARDS**

MAY 2025

Second Place – MetaFood CVPR Workshop Challenge 2025 – CVPR 2025 – MetaFood Workshop

Challenge: 3D Reconstruction From Monocular Multi-Food Images

Team OneVol – Ahmad AlMughrabi, Umair Haroon, Ricardo Marques, Petia RadevaWrite here the description...

JUN 2024

First Place – MetaFood CVPR Workshop Challenge 2024 – CVPR 2024 – MetaFood Workshop

Challenge: Physically Informed 3D Food Reconstruction

Team VoLETA – Ahmad AlMughrabi, Umair Haroon, Ricardo Marques, Petia Radeva

2022

FI-SDUR Pre-Doctoral Scholarship – University of Barcelona for PhD Degree

2020

100% Study Scholarship – Sejong University for Master’s Degree

● **PROJECTS**

DeepFoodVol, IDEATE, and A-BMC Projects: Research projects focused on AI-driven 3D reconstruction, food volume estimation from images, and biomedical imaging.

Funded by MICINN/AEI/FEDER and European Union NextGenerationEU/PRTR. **[Principal Investigator]**

MUSAE: A human-centred factory for future technological sustainable development driven by arts, focusing on innovative digital technology solutions in the food domain to improve human and planetary wellbeing.

Supported by the European Union’s Horizon Europe research and innovation programme. **[Participating Researcher]**

Multi-view Video Data Analysis Technology for Smart City based Intelligent Surveillance System.

Korea Research Foundation (KRF) **[Participating Researcher]**

Development of AI-Convergence Technologies for Smart City Industry Productivity Innovation

Korea Institute for Advancement of Technology **[Participating Researcher]**

Personalized Video Contents Summarization Technology

Korea Research Foundation (KRF) **[Participating Researcher]**

Smart Home Automation System

Small-Scale Research Project. **[Participating Developer]**

Real-Time Hand-Gestures Recognition for Hearing Impaired Individuals Using Raspberry Pi and Flex Sensors

Small-Scale Research Project. [Participating Developer]

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LANGUAGE SKILLS

Mother tongue(s): URDU

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C1
SPANISH	A1	A1	A1	A1	A1

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SKILLS

Cross-Cultural Collaboration | Programming & Frameworks | Scientific Research & Publication | Multimodal Data Analysis | Data Preprocessing & Augmentation | Action and Activity Recognition | Volume Estimation & Object Measurement | 3D Computer Vision | Deep Learning for Computer Vision | Neural Radiance Fields (NeRF) | Machine Learning & Data Modeling | Research & Scientific Communication

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RECOMMENDATIONS

Prof. Petia Ivanova Radeva

PhD Supervisor

Petia Radeva is a Full Professor at the Department of Mathematics and Computer Science, University of Barcelona, Barcelona, Spain

Email petia.ivanova@ub.edu

Prof. Ricardo Marques

PhD Co-Supervisor

Ricardo Marques is a Lecturer at the Department of Mathematics and Computer Science, University of Barcelona, Barcelona, Spain

Email ricardo.marques@ub.edu

Prof. Sung Wook Baik

Masters Supervisor

Sung Wook Baik is full Professor and head of Intelligent Media Laboratory, Department of Software, Sejong University, Seoul, South Korea.

Email sbaik@sejong.ac.kr

Prof. Khan Muhammad

Masters Co-Supervisor

Khan Muhammad is Assistant Professor at the Department of Software, Sejong University, Seoul, South Korea.

Email khan@sejong.ac.kr

Prof. Muhammad Sajjad

Academic Advisor

Muhammad Sajjad is an Associate Professor at the Department of Computer Science, Islamia College Peshawar, Pakistan.

Email muhammad.sajjad@icp.edu.pk