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| CONTACT INFORMATION | CMVS Office TS311, Cent. for Mach. Vis. & Signal Analysis, University of Oulu, Finland. | +358-41-368-2091 ✉ muzammil.behzad@{oulu.fi, gmail.com} 🌐 http://www.muzammilbehzad.com |
| RESEARCH INTERESTS | Affective Computing, Signal and Image Processing, Machine Learning, Deep Learning | |
| EDUCATION | Ph.D. in Technology (Fully-funded) University of Oulu , Oulu, Finland. <ul style="list-style-type: none">• CGPA: 5.00/5.00• Thesis Topic: <i>4D Micro-Expression Recognition in the Real World</i>• Advisor: Prof. Guoying Zhao (Ph.D., Chinese Academy of Sciences, China)• Courses: Affective Computing, Machine Learning, Deep Learning, Human Computer Interaction, Machine Vision. | Sep. 2018 - Present |
| | Exchange Student (Fully-funded) Brown University , Providence, U.S. <ul style="list-style-type: none">• Exchange Student in Semester Program: <i>Computer Vision</i>• Hosted by Institute for Computational and Experimental Research in Mathematics | Feb. 2019 - May 2019 |
| | M.S. in Electrical Engineering (Fully-funded) King Fahd University of Petroleum and Minerals , Dhahran, Saudi Arabia. <ul style="list-style-type: none">• CGPA: 3.821/4.00• Thesis Topic: <i>Compressed Sensing Based Image Denoising</i> (available online)• Advisor: Prof. Tareq Y. Al-Naffouri (Ph.D., Stanford University, U.S.)• Courses: Stochastic Processes, Digital Signal Processing, Image Processing, Digital Communications I, Digital Communications II, Adaptive Filtering and Applications. | Sep. 2014 - Jan. 2017 |
| | B.S. in Electrical Engineering (Partially-funded) COMSATS University Islamabad (CUI) , Islamabad, Pakistan. <ul style="list-style-type: none">• CGPA: 3.87/4.00 (90.53%), Distinction - Double Medalist, Valedictorian• Final Year Project: <i>GPS & GSM Based Vehicle Tracking System</i> (available online)• Advisor: Prof. Mahmood Ashraf Khan (Ph.D., Aston University, U.K.)• Major: Wireless Communications and Embedded Systems | Sep. 2009 - Aug. 2013 |
| PROFESSIONAL EXPERIENCE (5+ YEARS) | Scientific Researcher University of Oulu , Oulu, Finland. <ul style="list-style-type: none">• Working in the Center for Machine Vision and Signal Analysis (CMVS) towards computer vision aided micro-expression analysis in the real world (MEiR). | Sep. 2018 - Present |
| | Research Scholar Brown University , Providence, U.S. <ul style="list-style-type: none">• Participating in the <i>Computer Vision</i> program hosted by Institute for Computational and Experimental Research in Mathematics (ICERM). | Feb. 2019 - May 2019 |
| | Full-time Researcher Pukyong National University , Busan, South Korea. <ul style="list-style-type: none">• Worked on real-time image processing and computer vision applications. | May 2018 - Aug. 2018 |
| | Research Associate COMSATS University Islamabad (CUI) , Islamabad, Pakistan. <ul style="list-style-type: none">• Undergraduate projects' supervision, BSCS and BSSE projects' coordination, research work and teaching: Digital Image Processing, Computer Graphics, Object Oriented Programming, Introduction to Computer Programming. | Sep. 2013 - May 2018 |

Visiting Research Scholar **Summers of 2015 & 2016**
King Abdullah University of Science and Technology, Thuwal, Saudi Arabia.
 • MS thesis research work - visiting research group of Prof. Tareq Y. Al-Naffouri

Graduate Teaching Assistant **Jan. 2015 - Jan. 2016**
King Fahd Univ. of Petr. and Min. (KFUPM), Dhahran, Saudi Arabia.
 • Stochastic Processes - Spring 2015 and Digital Communications I - Fall 2015.

Research and Project Intern **Jun. 2012 - Jun. 2013**
Centre for Advance Studies in Telecommunication, Islamabad, Pakistan.
 • Worked on: Final Year Project, GPS & GSM Based Embedded Systems, PCB, Hardware and Circuit Designing, Thesis and Research Work.

Network Intern **Jul. 2011 - Sep. 2011**
National Telecom Corporation (NTC), Islamabad, Pakistan.
 • Worked on: Networking Project, Routing Protocols, C/C++ Programming, Practical Implementation on Simulation Software.

AWARDS AND ACHIEVEMENTS

Fully-funded Ph.D. Degree at University of Oulu, Finland Sep. 2018 - Present
Recipient of Two IBM Developer Badges for Machine Learning and Data Science 2020
Recipient of Intel[®] EdgeAI Scholarship 2019 - 2020
Fully-funded Exchange Semester at Brown University, U.S. Feb. 2019 - May 2019
Fully-funded M.S. Degree at KFUPM, Saudi Arabia Sep. 2014 - Jan. 2017
Employee of the Year & Best Supervised Project Award in CUI 2014
Valedictorian - Honor of Giving Graduation Speech in my Convocation at CUI 2013
Institute Silver Medal Award in B.S. Electrical Engineering 2013
Campus Silver Medal Award in B.S. Electrical Engineering 2013
Laptop awarded by Gov. of Pakistan for holding the top Position in B.S. 2013
Runner Up in National-level Line Tracking Robotics Competition ROBIA'12 2012
1st Position in Inter-Departmental Debate/Declamation Competition 2012
Talent Award for Batch Position Holder by SAFE (NGO) at CUI 2010
Prize Money Merit-Scholarships by CUI During B.S. Studies 2009 - 2013

RESEARCH GRANTS

CMVS International Res. Visit Grant by Univ. of Oulu, Finland [**5000 Euros**] 2020
 ICERM International Semester Program by Brown University, US [**5700 USD**] 2019

TECHNICAL SKILLS

Computer Programming

- C/C++, MATLAB, Python 2.7/3.5 (scikit-image/learn, OpenCV, DLib, TensorFlow, TensorBoard), R, HTML, Assembly

Computer Networking (CCNA-Certification)

- IP Addressing, OSI/TCP Model, Routing, Switching, Subnetting, Supernetting, Routing Protocols, Network Programming, Socket Programming, TCP Handshaking

Operating Systems, IDEs and Applications

- IBM Watson, Windows, Linux, L^AT_EX(Miktex, WinEdt, TeXStudio), Anaconda, Spyder, Jupyter Notebook, Proteus, Packet Tracer, CodeVisionAVR

MANAGEMENT, WORKSHOPS, CONFERENCES AND TRAININGS

Attended 30th British Machine Vision Conference (BMVC), Cardiff, U.K. 2019
 Workshop: Opt. Methods in Comp. Vis. & Im. Proc., Brown University, U.S. 2019
 Participated in ICERM's Journal Club as Member, Brown University, U.S. 2019
 Workshop: Julia Programming, Massachusetts Inst. of Technology (MIT), U.S. 2019
 Workshop: Computational Imaging, ICERM, Brown University, U.S. 2019
 My Invited Talk: Spontaneous Micro-expression Recognition, Brown Uni., U.S. 2019
 Workshop: Professional Development Ethics, ICERM, Brown University, U.S. 2019
 Workshop: Image Descrip. for Consumer & Overhead Imagery, Brown Uni., U.S. 2019

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| | Workshop: Theory & Pract. in Mach. Lear. & Comp. Vision, Brown Uni., U.S. | 2019 |
| | Represented Pakistan in Festival of Cultures , University of Oulu, Finland | 2018-19 |
| | Attended Speedup Your Literature (IRIS.AI), University of Oulu, Finland | 2018 |
| | Attended InfoTech Brainstorming Conference, University of Oulu, Finland | 2018 |
| | Attended IEEE International Conference on Consumer Electronics, South Korea | 2018 |
| | Pioneer Team Member, CUI Hybrid Learning Pioneered for Pakistan | 2017-18 |
| | Attended & Presented Research Paper at 32nd IEEE AINA conference, Poland | 2018 |
| | Delivered Many Presentations on CUI's Hybrid Learning Model | 2017-18 |
| | Represented CUI in Frontiers of Information Technology Conference | 2013 & 2017 |
| | Workshop: Indoor Positioning and Navigation, KAUST Enrichment Program | 2017 |
| | Attended iPakistan: Innovative Forum for Computer Scientists by CUI | 2016 |
| | Organized and Captained Multi-national KFUPM Premier League (Cricket) | 2016 |
| | Represented Pakistan in Festival of Cultures in KFUPM, Saudi Arabia | 2015 |
| | Participated and Represented CUI in 3rd Pak-China Business Forum | 2014 |
| | Organized All-Pakistan Robotics Competition 'ROBIAN' Twice at CUI | 2012 & 2013 |
| | Organized CUI's 46th Graduation Convocation as Usher | 2012 |
| | Organized Inter & Intra-University Debate/Declamation Contests at CUI | 2012 |
| | Attended Workshop on Robotic Designing in CUI | 2012 |
| CERTIFICATIONS | <ul style="list-style-type: none"> ● Machine Learning with Python <i>from</i> IBM via Coursera ● Python for Data Science and AI <i>from</i> IBM via Coursera ● Python Data Structures <i>from</i> University of Michigan via Coursera ● Crash Course on Python <i>from</i> Google via Coursera ● What is Data Science? <i>from</i> IBM via Coursera ● AI For Everyone <i>from</i> deeplearning.ai via Coursera ● Mathematics for Machine Learning <i>from</i> Imperial College London via Coursera ● Deep Learning for Business <i>from</i> Yonsei University via Coursera ● Programming for Everybody <i>from</i> University of Michigan via Coursera ● Machine Learning <i>from</i> Stanford University via Coursera ● CCNA Discovery, Security, and IT Essentials <i>from</i> CISCO Regional Academy | 2020 2020 2020 2020 2020 2020 2019 2019 2019 2018 2012 |
| PROFESSIONAL MEMBERSHIP | Member , The British Machine Vision Association (BMVA) Member , The European Telecommunications Standards Institute (ETSI) Student Member , Institute for Electrical & Electronics Engineers (IEEE) Member , Society for Industrial and Applied Mathematics (SIAM) Lifetime Member , Pakistan Engineering Council (PEC) | since 2019 since 2019 since 2016 since 2015 since 2013 |
| PERSONAL SKILLS | <ul style="list-style-type: none"> ● Languages: English (Expert), Urdu (Expert), Pushtu (Expert), Arabic (Beginner) ● Strong technical writing, formal reporting, communication, and presentation skills ● Quick learner, dedicated, highly motivated, enthusiastic, confident and team player | |
| VOLUNTARY SERVICES | Volunteer in Voluntary Work Unit on KFUPM Volunteer's Day, Saudi Arabia Volunteer in Pakistan Hajj Volunteer Group (PHVG) , Saudi Arabia | 2015 2014 |
| ACADEMIC AND RESEARCH PROJECTS | Real-time Face Mask Detection for COVID-19 Pandemic Deep Learning, Live webcam, MATLAB2019b, Python 3.7, OpenCV, Keras with TensorFlow Backend, AlexNet, Accuracy = 92.3%, GitHub Repository, Live Demo LC4D: Landmarks-assisted 4D Facial Expression Recognition MATLAB2019a, 3D/4D Point Clouds, GoogLeNet and VGGNet (BU-4DFE Dataset of 6 emotional Classes with 224x224 Images), Landmarks-assisted Collaborative end-to-end Deep Framework, Accuracy = 96.7% CCDN: Collaborative 4D Facial Expression Recognition MATLAB2019a, 3D/4D Point Clouds, VGGNet (41 Layers Trained on pre-processed BU-4DFE Dataset of 6 emotional Classes with 224x224 Images), Cross-domain Dynamic Image Representations of Input 4D Face Scans, Accuracy = 96.5% | |

AlexNet based Face Recognition on Self-Generated Live Webcam Dataset

MATLAB2018b, Fine-tuning AlexNet's (5 Convolutional and 10 FC Layers Trained on ImageNet Dataset of 1000 Classes with 227x227 Images), Retraining FC Layers with 10 Subjects (1000 M/F Samples Each), Input Image Pre-processed for Face Detection via Viola-Jones Detector , Live Demo of Recognition System

Fine-Tuning ResNet on CIFAR10 Dataset

Python 3.5 (mainly using TensorFlow, TensorBoard, Keras, in Spyder), Collecting CIFAR10 Dataset (60,000 32x32 images in 10 classes, 6000 Images/Class), Pre-trained Model ResNet-50 v3-fp32, Fine Tuning of ResNet's Final-layer (Training/Testing/CrossEntropy Accuracy of 87.05%/86.75%/0.43, 38.92%/34.65%/1.48 and 16.40/15.84%/1.99 at 10,000, 1,000 and 100 steps, respectively)

Deep Learning Classification on Fashion MNIST dataset

Python 3.5 (mainly using TensorFlow, TensorBoard, Keras, in Spyder), Collecting Fashion MNIST Dataset (70,000 28x28 Images in 10 Classes), Exploring and Pre-processing the Data, Training a Neural Network Model (Layers: Input = 28*28, Hidden = 128, Output = 10, Parameters: 5 Epochs, Training Size = 60,000), Visualizing over TensorBoard (Training Accu. = 89.03%, Testing Accu. = 87.06%)

Multi-modal Expressions Recognition System

Python 2.7 (mainly using SciPy, NumPy, Matplotlib, sklearn, skimage in Jupyter Notebook), Feature-level Method to Combine Facial and Speech features (Happy and Sad Emotions), Feature Fusion for Linear SVM Classifier via Principal Component Analysis (Accu. = 98.21%) and Canonical Correlation Analysis (Accu. = 92.31%)

Expressions Recognition from Speech Signals

Python 2.7 (mainly using SciPy and NumPy in Jupyter Notebook), Extracting Prosodic and Mel-Frequency Cepstral Coefficients Features from Speech Dataset (10 speakers with Happy and Sad Emotions), Classifiers: SVM with Polynomial Kernel (Accu. = 86.21%), Random Forest (Accu. = 88.31%) and Neural Network having 3 Hidden Layers of 50 Units Each with 20,000 Iterations (Accu. = 90.35%)

Facial Expressions Recognition from eINTERFACE Dataset

Python 2.7 (mainly using scikit-image, DLib in Jupyter Notebook), Faces Detection, Pre-processing and Registration on eINTERFACE Dataset (Happy and Sad Emotions), LBP Features for SVM Classifier (Accuracy = 72.25%)

Real-Time Fast Video Deraining

Programming in MATLAB, Exploiting Temporal Information, Video Frames, Extracting and Grouping Patches, Code Optimization for Faster Processing

Compressed Sensing based Image Denoising - M.S. Thesis Project

Compressed Sensing, Image and Signal Processing, Extracting and Grouping Patches, MATLAB Programming, Thesis/Research Papers, Simulations

GPS and GSM Based Vehicle Tracking System - B.S. Final Year Project

Wireless Communication, GPS & GSM, Embedded Systems, C/C++ Programming, Networking, PCB and Circuit Designing, Thesis/Research Papers, Simulations

Client-Server Architecture on Linux OS

C/C++ Programming, Linux Network Programming, Socket Programming, File Transferring, OSI/TCP Model, Local-Host Client-Server Communication

RFID Based Remote Authentication System

Embedded Systems, C/C++ Programming, Microcontroller ATmega16

Line Tracking Autonomous Robot

Embedded Systems, Assembly and C++ Programming, Microcontroller, Sensors

Routing Protocols RIP/IGRP/EIGRP/OSPF Implementation

Routing, Network Programming, IP Addressing, Subnetting, Routing Protocols

Binary Clock and Kitchen Timer

Programming, Embedded Systems, PCB Designing, Digital Logic Design

C/C++ Programming Projects on Windows/Linux OS

Client-Server Server, Authentication System, Student/Faculty Management System

- M. Behzad**, et al., “Performance Optimization in IoT-based Next-Generation Wireless Sensor Networks”, *Transactions on Computational Collective Intelligence*, 2019.
- M. Behzad**, M. S. Javaid, M. A. Paracha and S. Khan, “Distributed PCA and Consensus Based Energy Efficient Routing Protocol for WSNs”, *Journal of Information Science & Engg.*, Vol. 33 Issue 5, p1267-1283, 2017 [IF = 0.468].
- M. Behzad**, et al., “Landmarks-assisted Collaborative Deep Framework for Automatic 4D Facial Expression Recognition”, *IEEE Face and Gestures* 2020.
- M. Behzad**, et al., “Automatic 4D Facial Expression Recognition via Collaborative Cross-domain Dynamic Image Network”, *BMVC* 2019.
- M. Behzad**, et al., “Layer-Adaptive Communication and Collaborative Transformed-Domain Representations to Optimize Performance in Next-Generation WSNs”, *The 32nd IEEE Int. Conference on Advanced Information Networking and Applications (AINA)*, Krakow, Poland, 2018.
- M. Behzad**, et al., “Technology-Mediated Educational Model”, *Int. Conf. on Professional Development in Higher Education: Trends and Practices, Prospects and Innovations*, Higher Education Commission of Pakistan, 2018.
- M. Behzad**, M. Masood, T. Ballal, M. Shadaydeh and T. Al-Naffouri, “Image denoising via collaborative support-agnostic recovery”, *The 42nd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, New Orleans, USA, 2017.
- M. Behzad** and Y. Ge, “Performance Optimization in Wireless Sensor Networks: A Novel Collaborative Compressed Sensing Approach”, *The 31st IEEE International Conference on Advanced Information Networking and Applications (AINA)*, Tamkang University, Taipei, Taiwan, 2017.
- M. Behzad**, N. Javaid, A. Sana, M. T. A. Khan, N. Saeed, Z. A. Khan, U. Qasim, “TSDDR: Threshold Sensitive Density Controlled Divide and Rule Routing Protocol for Wireless Sensor Networks”, *The 9th IEEE International Conference on Broadband and Wireless Computing, Communication and Applications (BWCCA)*, Guangzhou, China, 2014.
- M. Behzad**, et al., “Design and Development of a Low Cost Ubiquitous Tracking System”, *The 9th International Conference on Future Networks and Communications (FNC)*, Niagara Falls, Ontario, Canada, 2014.
- F. Saleem, Y. Moeen, **M. Behzad**, M. A. Hasnat, Z. A. Khan, U. Qasim, N. Javaid, “IDDR: Improved Density Controlled Divide-and-Rule Scheme for Energy Efficient Routing in Wireless Sensor Networks”, *The 9th International Conference on Future Networks and Communications (FNC)*, Niagara Falls, Canada, 2014.
- A. Umar, M. A. Hasnat, **M. Behzad**, I. Baseer, Z. A. Khan, U. Qasim, N. Javaid, “On Enhancing Network Reliability and Throughput for Critical-Range Based Applications in UWSNs”, *The 9th International Conference on Future Networks and Communications (FNC)*, Niagara Falls, Ontario, Canada, 2014.
- M. M. Sandhu, M. Akbar, **M. Behzad**, N. Javaid, Z. A. Khan, U. Qasim, “REEC: Reliable Energy Efficient Critical data routing in wireless body area networks”, *The 9th IEEE International Conference on Broadband and Wireless Computing, Communication and Applications (BWCCA)*, Guangzhou, China, 2014.
- M. M. Sandhu, M. Akbar, **M. Behzad**, N. Javaid, Z. A. Khan, U. Qasim, “Mobility Model for WBAN”, *The 9th IEEE International Conference on Broadband and Wireless Computing, Communication and Applications (BWCCA)*, Guangzhou, China, 2014.

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| SUBMITTED/ PENDING PAPERS | <p>J3 A. M. Alanazi, M. Behzad, et al., “A Collaborative Filtering-Based Method for Image Denoising”, <i>IEEE Transactions on Image Processing</i> [Submitted].</p> |
| ACADEMIC POSTERS | <p>CP1 M. Behzad and T. Al-Naffouri, “Minimum Distance Based Energy efficiency Using Hemisphere Zoning with Advanced Divide-and-Rule Scheme for WSNs”, <i>in 6th Annual KFUPM Students Scientific Forum</i>, 2015.</p> |
| REFEREE SERVICES | <ul style="list-style-type: none"> ● Invited Reviewer, Neurocomputing 2020 - Present ● Track Co-chair, International Conference on Complex, Intelligent, and Software Intensive Systems, University of Technology Sydney, Australia 2018 - 2020 ● Reviewer, Transactions on Computational Collective Intelligence 2018 - Present ● Reviewer, The 13th International Conference on Complex, Intelligent, and Software Intensive Systems, University of Technology Sydney, Australia 2018 - 2019 ● Reviewer, IEEE Networking Letters 2018 - Present ● Reviewer, International Conference on Advances in Signal Processing and Artificial Intelligence 2019 - Present ● Reviewer, The 4th International Conference on Digital Information & Communication Technology and its Applications, Thailand 2014 |