

Ghulam Muhammad

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Summary:

Ghulam Muhammad is a full professor in the Department of Computer Engineering, College of Computer and Information Sciences at King Saud University (KSU), Riyadh, Saudi Arabia. Prof. Ghulam received his Ph.D. degree in Electronic and Information Engineering from Toyohashi University and Technology, Japan in 2006, M.S. degree from the same university in 2003. He received his B.S. degree in Computer Science and Engineering from Bangladesh University of Engineering and Technology in 1997. He was a recipient of the Japan Society for Promotion and Science (JSPS) fellowship from the Ministry of Education, Culture, Sports, Science and Technology, Japan. His research interests include AI, signal processing, machine learning, IoTs, medical signal and image analysis, and biometrics. Prof. Ghulam has authored and co-authored more than 300 publications including IEEE / ACM / Springer / Elsevier journals, and flagship conference papers. He owns four U.S. patents. He received the best faculty award of Computer Engineering department at KSU during 2014-2015. He has supervised more than 25 Ph.D. and Master Theses. Prof. Ghulam is involved in many research projects as a principal investigator (approximate amount of 0.75 million US dollars) and a co-principal investigator (approximate amount of 1.8 million US dollars).

Key Performance

- Received the **Research Excellence Award 'Lifetime Achievement'** (in the category of Economies of the Future) – 2024, by the Research Development and Innovation Authority (RDIA) and given by the H.E. Minister of Communications and Information Technology
- **Highly Cited Researcher 2023** (Clarivate Analytics – Web of Science)
- **Best faculty award**, Computer Engineering Department
- More than 25 Ph.D./MS **Thesis supervision** at KSU
- **Owns four US patents**
- 250+ ISI-indexed journal publications, mostly Q1 and Q2
- **Editor** of Information Fusion journal (top 2%), IEEE Internet of Things Journal (top 4%)
- Supervised **projects won first and third prizes** in SAMI-KSU annual project competitions
- Principal investigator (PI) and Co-PI of 15+ **funded research projects** from MoE and KACST.
- Showcased prototypes of “Mobile Robot for Plant Disease Detection”, “Hand rehabilitation system using a hand exoskeleton”, and “Rafiki: Robot for sign language” in innovation expo.
- **Clarivate Analytics H-index: 65; Google Scholar H-index: 89**

Citation Metrics

- Scopus: <http://www.scopus.com/authid/detail.url?authorId=56605566900>
- Google Scholar: <https://scholar.google.com.sg/citations?user=mmKu4-EAAAAJ&hl=en&safe=on>
- WoS ID: <https://www.webofscience.com/wos/author/record/H-5884-2011>
- ORCID ID: <http://orcid.org/0000-0002-9781-3969>
- Publon Profile: <https://publons.com/researcher/2764744/ghulam-muhammad/>

Media Coverage:

- <https://www.spa.gov.sa/en/N2260759>
- <https://www.onearabia.me/local/minister-of-communications-honors-scientists-innovators-leap25-011-98387.html>
- <https://alriyadhdaily.com/article/877c743ee87e43a3b60f370fa0004af0>

Education:

Ph.D. *March 2006*

Electronic and Information Engineering, Toyohashi University of Technology, Japan.

Thesis Title: A study on auditory based feature extraction and HMM/SM based classification for robust automatic speech recognition

M.S. *March 2003*

Knowledge-based Information Engineering, Toyohashi University of Technology, Japan.

Thesis Title: Normalization of Acoustic Quality of the Monophones in an Utterance.

B.S. *July 1997*

Computer Science and Engineering, Bangladesh University of Engineering and Technology, Bangladesh.

Academic Experience:

Professor

23 January 2017 – present

Department of Computer Engineering,
College of Computer and Information Sciences (CCIS),
King Saud University (KSU), Riyadh, Saudi Arabia

Associate Professor

September 2011 – 22 January 2017

Department of Computer Engineering,
College of Computer and Information Sciences (CCIS),
King Saud University (KSU), Riyadh, Saudi Arabia

Assistant Professor

August 2007 – August 2011

Department of Computer Engineering,
College of Computer and Information Sciences (CCIS),
King Saud University (KSU), Riyadh, Saudi Arabia

JSPS Post-Doctoral Research Fellow

April 2007 - August 2007 (shortened)
Ministry of Education, Japan & Toyohashi University of Technology, Japan.

Toshiba Research Fellow

April 2006 - March 2007

Toyohashi University of Technology, Japan. Collaboration with Toshiba Corporation, Japan.

Courses Taught:

Undergraduate: Signals and Systems (CEN340; CEN351), Digital signal processing (CEN352); Introduction to digital control (CEN455); Digital speech processing (CEN460), Digital image processing (CEN465).

Graduate and post-graduate (Ph.D.): Digital signal processing (CEN543); Digital image processing (CEN545); Digital Speech processing (CEN547); Speech and video signal processing (CEN643); Advanced digital signal processing (CEN645).

Thesis Supervision:

Ph.D. Supervision (total 13 students)

2024 –

- Multi-Modal and Multi-View Deep Learning-Based Driver's Fatigue and Distraction Detection System for Intelligent Vehicles, *Lina Noaman Alkhatib*

2022 – 2024

- Ischemic stroke image segmentation using few-shot learning, *Fatimah Shinan Alshehri*
- Attention-based deep learning techniques for decoding motor imagery EEG brain signals, *Hamdi Taher Altaheri*
- Advanced Deep Segmentation Architectures for the Analysis of Medical Imagery, *Hamdan Sulaiman Al Jowair*, co-supervising
- Abnormal Event Detection for Video Surveillance Using Transformer Model, *Abdulrahman Alshalawi*, co-supervising

2021 – 2022

- A multi-branch convolutional neural network model for electroencephalogram-based motor imagery classification, *Ghadir Ali Altuwaijri*

2020 – 2022

- Sensor based Human Activity Recognition with Spatio Temporal Deep Learning, *Ohoud Nafea Bakeat Almohammadi*, co-supervising

2019 – 2023

- Human Fall Detection Using Multistream Convolutional Neural Networks with Fusion, *Thamer Alanazi*

2017 – 2020

- Hand gesture recognition for sign language using deep learning techniques, *Muneer Hamid A. Al-Hammadi*
- Deep Learning for Brain's Motor Imagery Activity Classification based on Electroencephalography, *Syed Umar Amin*, co-supervising
- A Novel Tree-Based Deep Convolutional Model, *Abduljawad A. Amory*, co-supervising

2014 – 2017

- Investigation of Frequency Regions for Voice Pathology Detection and Classification, *Ahmed Al-nasheri*
- Automatic Voice Pathology Assessment System for Vocal Fold Disorders, *Zulfiqar Ali*, co-supervising, University Teknologi Petronas, Malaysia.

2009-2013

- A multi-directional feature extraction technique for speaker recognition, *Awais Mahmood*, co-supervising

Master Thesis / Project Supervision (total 15 students)

2020-2021

- (Thesis) Tuberculosis Detection in Chest Radiograph by Using Convolutional Neural Networks Architecture, *Saad Ibrahim Nafisah*

2018-2020

- (Thesis) A vision system for date harvesting robot, *Hamdi Altaheri*

2013-2015

- (Thesis) Image forgery detection based on texture descriptors, *Aisha Al-Bogami*
- (Project) Image forgery detection using MSB and local texture descriptors, *Mai Sulaiman Hamad Altulyan*
- (Thesis) Detection and/or Classification of Voice Pathology Using Feature Selection, *Malak Mohammad AlMojaly*
- (Thesis) Automatic voice pathology detection based on vocal tract area measurement, *Ghadir Ali AlTuwaijri*
- (Thesis) Automatic Pronunciation Error Detection of Non-native Arabic Speech, *Afnan Waheed AlHindi*

2012-2013

- (Thesis) Copy Move Image Forgery Detection Based on Multi-resolution Techniques, *Muneer Hamid Ahmed Al-Hammadi*
- (Project) Category Specific Face Recognition Using Bandlets, *Faten Abdullah Alomar*
- (Thesis) Voice Pathology Detection Based on MPEG-7 Features, *Moutasem Melhim*
- (Thesis) Automatic Detection of Copy-Move Image Forgery Based on Clustering Technique, *Motasem S. Al-Sawadi*
- (Project) Face Recognition Using Ridgelet Coefficients, *Mutib Hamdan AL-Enazi*

2011-2012

- (Project) Applying Feature Selection on Local Binary Patterns/WLD for Ethnicity classification for Category-specific Face Recognition, *Fatimah Alanizi*

2009-2010

- (Thesis) Feature selection based verification system using palm and fingerprint, *Muhanad M. Jazzar*
- (Project) Extract context from environment sound, *Mobarak Obaid Alqahtani*

Academic Committee Involvement:

- Department ABET and NCAAA committee member (2010 – present)
- Department course curriculum committee member (2011 – 2012)
- College NCAAA committee member (2012 – 2013)
- Executive committee member, Research Center, CCIS, KSU (2017 – present)
- Editorial board member, KSU-CIS Journal (2017 – present), Q1

Research Interest:

- Artificial Intelligence

- Machine Learning
- Speech Signal Processing
- Digital Image Processing
- Biometrics
- Smart Healthcare and IoTs
- Multimedia Forensics.

Publications:

Patent

1. “Environment recognition of audio input”, US Patent No.: 8,812,310 B2, Issue date: August 19, 2014; Inventors: **Ghulam Muhammad** and Khaled S. Alghathbar.
(<https://patentimages.storage.googleapis.com/35/1b/fb/91996575d09385/US8812310.pdf>)

2. “Tree harvesting tool”, US Patent No.: 10,485,171 B1, Issue Date: November 26, 2019; Inventors: Mohamed Amin Mekhtiche, et al.

(<https://patentimages.storage.googleapis.com/fa/24/b4/7185e1c2d7cc63/US10485171.pdf>)

3. “Robotic systems for harvesting and maintain date palms,” US Patent No.: 11,910,751 B1, Issue Date: February 27, 2024; Inventors: Mohamed Amin Mekhtiche, et al.

(<https://patents.google.com/patent/US11910751B1/en>)

4. “System and Method for Detecting Diseases Among Plants,” US Patent No.: US 12,277,762 B1; Filed: December 19, 2024; Issue date: April 15, 2025; Inventors: **Ghulam Muhammad**, et al.

(<https://patents.justia.com/patent/12277762>)

Database

Speech Database

Mansour Alsulaiman, **Ghulam Muhammad**, Bencherif Mohamed Abdelkader, Awais Mahmood, Zulfiqar Ali, King Saud University Arabic Speech Database LDC2014S02. Web Download. Philadelphia: Linguistic Data Consortium, 2014. ISBN 1-58563-669-X; <https://catalog.ldc.upenn.edu/LDC2014S02>

Date Fruits Database

H. Altaheri, M. Alsulaiman, M. Faisal, and **G. Muhammad**, “Date Fruit Dataset for Automated Harvesting and Visual Yield Estimation,” IEEE DataPort, v1, 2019. DOI: 10.21227/x46j-sk98.

Book Chapter

1. Syed Umar Amin, Mansour Alsulaiman, **Ghulam Muhammad**, M Shamim Hossain, and Mohsen Guizani, “Deep Learning for EEG Motor Imagery-Based Cognitive Healthcare,” Book:

Connected Health in Smart Cities, pp. 233-254, Eds. A. El Saddik, M. S. Hossain, B. Kantarci, 2020, Springer.

Journal Publications (underline means I am the corresponding author)

2025

314. Abdulrahman Alshalawi, Wadood Abdul, and **Ghulam Muhammad**, “Advanced Detection of Violence from Video: Performance Evaluation of Transformer and state of the art of convolution of neural network transformer,” IEEE Access, vol. 13, pp. 74200-74216, May 2025. DOI: 10.1109/ACCESS.2025.3564435 [*ISI indexed*]
313. Anichur Rahman, Dipanjali Kundu, Tanoy Debnath, Muaz Rahman, Utpol Kanti Das, Abu Saleh Musa Miah, and **Ghulam Muhammad**, “From AI to the Era of Explainable AI in Healthcare 5.0: Current State and Future Outlook,” Expert Systems, vol. 42, Issue 6, e70060, pp. 1-36, June 2025. DOI: 10.1111/exsy.70060 [*ISI indexed*]
312. Isha Kansal, Vikas Khuallar, Gifty Gupta, Deepali Gupta, Sapna Juneja, Ali Nauman, and **Ghulam Muhammad**, “Deep Learning-Based Privacy Preserving Multimodal Biometrics Recognition for Cross-Silo Datasets,” Expert Systems, vol. 42, Issue 6, e70053, pp. 1-25, June 2025. DOI: 10.1111/exsy.70053 [*ISI indexed*]
311. Sunil Prajapat, Pankaj Kumar, Ashok Kumar Das, and **Ghulam Muhammad**, “Generative AI-Enabled Quantum Encryption Algorithm for Securing IoT-Based Healthcare Application Using Blockchain,” IEEE Internet of Things Journal, 2025. DOI: 10.1109/JIOT.2025.3555159 [*ISI indexed*]
310. Zhiguo Qu, Yichen Xia, Le Sun, Wenjie Liu, and **Ghulam Muhammad**, “QCACNN: A Quantum Convolutional Neural Network Algorithm for Traffic Sign Recognition in Carbon-Intelligent Electric Vehicles,” IEEE Internet of Things Journal, vol. 12, no. 16, 2025. DOI: 10.1109/JIOT.2025.3553897 [*ISI indexed*]
309. Md. Milon Islam, Fakhri Karray, and **Ghulam Muhammad**, “MSF-Net: Multi-stage fusion network for emotion recognition from multimodal signals in scalable healthcare,” Information Fusion, vol. 119, 103028, July 2025. DOI: 10.1016/j.inffus.2025.103028 [*ISI indexed*]
308. Kranthi Kumar Singamaneni, Anil Kumar Budati, Shayla Islam, Raenu Kolandaisamy, and **Ghulam Muhammad**, “A Novel Hybrid Quantum-Crypto Standard to Enhance Security and Resilience in 6G enabled IoT Networks,” IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2025. DOI: 10.1109/JSTARS.2025.3540905 [*ISI indexed*]
307. Chintha Sri Pothu Raju, Rabul Hussain Laskar, Zulfiqar Ali, and **Ghulam Muhammad**, “Attention-based Fusion for Stroke Lesion Segmentation on Computed Tomography Perfusion Data,” ACM Transactions on Multimedia Computing, Communications, and Applications (ACM TOMM), 2025. DOI: 10.1145/3716632 [*ISI indexed*]
306. Jingchun Zhou, Jingchun Zhou, Chunjiang Liu, Bing Long, Dehuan Zhang, Qiuping Jiang, and **Ghulam Muhammad**, “Degradation-Decoupling Vision Enhancement for Intelligent Underwater Robot Vision Perception System,” IEEE Internet of Things Journal, vol. xx, no. x, 2025. DOI: 10.1109/JIOT.2025.3540033 [*ISI indexed*]

305. Zhiguo Qu, Xuemeng Zhao, Le Sun, and **Ghulam Muhammad**, “DAQFL: Dynamic Aggregation Quantum Federated Learning Algorithm for Intelligent Diagnosis in Internet of Medical Things,” IEEE Internet of Things Journal, vol. 12, no. 18, 2025. DOI: 10.1109/JIOT.2025.3537614 [*ISI indexed*]
304. Zhiguo Qu, Xiyu Fu, Le Sun, and **Ghulam Muhammad**, “QDICP: A quantum blockchain model for copyright protection of digital images in consumer electronics,” IEEE Transactions on Consumer Electronics, 2025. DOI: 10.1109/TCE.2024.3522276 [*ISI indexed*]
303. Pooja Kherwa, Jyoti Arora, Tripti Sharma, Deepali Gupta, Sapna Juneja, **Ghulam Muhammad**, and Ali Nauman, “Contextual Embedded Text Summarizer System: A Hybrid Approach,” Expert Systems, vol. 42, no. 2, e13733, pp. 1-18, February 2025. DOI: 10.1111/exsy.13733 [*ISI indexed*]
302. Mingzhe Zhai, Qianhong Wu, Yizhong Liu, Bo Qin, Yang Yang, **Ghulam Muhammad**, and Prayag Tiwari, “Privacy Preservation in AI-Driven IoT for Vehicles via Hierarchical Sharding Blockchain,” IEEE Internet of Things Journal, vol. 12, no. 8, 2025. DOI: 10.1109/JIOT.2024.3513770 [*ISI indexed*]
301. Md. Sakhawat Hossain Rabbi, Md. Masbahul Bari, Tanoy Debnath, Anichur Rahman, Avik Kumar Das, Md. Parvez Hossain, and **Ghulam Muhammad**, “Performance Evaluation of Optimal Ensemble Learning Approaches with PCA and LDA-based Feature Extraction for Heart Disease Prediction,” Biomedical Signal Processing and Control, Vol. 101, 1071382025, pp. 1-21, March 2025. DOI: 10.1016/j.bspc.2024.107138 [*ISI indexed*]
300. Le Sun, Wenzhang Dai, and **Ghulam Muhammad**, “Gating Memory Network Multi-Layer Perceptron for Traffic Forecasting in Internet-of-Vehicles systems,” IEEE Internet of Things Journal, vol. 12, no. 5, pp. 4783-4793, March 2025. DOI: 10.1109/JIOT.2024.3486722 [*ISI indexed*]
299. Le Sun, Shunqi Liu, and **Ghulam Muhammad**, “FedWFC: Federated Learning with Weighted Fuzzy Clustering for Handling Heterogeneous Data in MIIoT Networks,” Alexandria Engineering Journal, vol. 111, pp. 194-202, January 2025. DOI: 10.1016/j.aej.2024.10.033 [*ISI indexed*]

2024

298. Ohoud Nafea, Wadood Abdul, and **Ghulam Muhammad**, “Incorporating Attention Mechanism into CNN-BiGRU Classifier for HAR,” IEEE Access, 2024. DOI: 10.1109/ACCESS.2024.3487860 [*ISI indexed*]
297. Sonia Goel, Meena Tushir, Jyoti Arora, Tripti Sharma, Deepali Gupta, Ali Nauman, and **Ghulam Muhammad**, “An Enhanced Integrated Method for Healthcare Data Classification with Incompleteness,” CMC-Computers, Materials & Continua, 2024. DOI: [*ISI indexed*]
296. Fatima Alshehri and **Ghulam Muhammad**, “Ischemic Stroke Segmentation by Transformer and Convolutional Neural Network Using Few-Shot Learning,” ACM Transactions on Multimedia Computing, Communications, and Applications, 2024. DOI: 10.1145/3699513 [*ISI indexed*]

295. Le Sun, Zhimeng Zhang, and **Ghulam Muhammad**, “Generative learning-based personalized federated learning for metaverse data security,” IEEE Systems, Man, & Cybernetics Magazine, 2024. DOI: 10.1109/MSMC.2024.3449572
294. Le Sun, Yueyuan Wang, Huiyun Li, and **Ghulam Muhammad**, “Fine-Grained Vulnerability Detection for Medical Sensor Systems,” Internet of Things, vol. 28, 101362, pp. 1-16, December 2024. DOI: 10.1016/j.iot.2024.101362 [ISI indexed]
293. Le Sun, Yuhang Li, and **Ghulam Muhammad**, “Soft Computing-driven Infrared and Visible Image Fusion Network for Security Application Service,” Applied Soft Computing, vol. 165, 112114, pp. 1-13, November 2024. DOI: 10.1016/j.asoc.2024.112114 [ISI indexed]
292. Pummy Dhiman, Amandeep Kaur, Deepali Gupta, Sapna Juneja, Ali Nauman, and **Ghulam Muhammad**, “GBERT: A Hybrid Deep Learning Model Based on GPT-BERT for Fake News Detection,” Heliyon, vol. 10, no. 10, e35865, August 2024. DOI: 10.1016/j.heliyon.2024.e35865 [ISI indexed]
291. Le Sun, Zhimeng Zhang, and **Ghulam Muhammad**, “FedCPD: A federated learning algorithm for processing and securing distributed heterogeneous data in the metaverse,” IEEE Open Journal of the Communications Society, vol. 5, pp. 5540- 5551, September 2024. DOI: 10.1109/OJCOMS.2024.3435389 [ISI indexed]
290. Kranthi Kumar Singamaneni and **Ghulam Muhammad**, “A Novel Integrated Quantum-Resistant Cryptography for Secure Scientific Data Exchange in Ad Hoc Networks,” Ad Hoc Networks, Vol. 164, 103607, pp. 1-12, November 2024. DOI: 10.1016/j.adhoc.2024.103607 [ISI indexed]
289. Thamer Alanazi, Khalid Babutain, and **Ghulam Muhammad**, “Mitigating Human Fall Injuries: A Novel System Utilizing 3D 4-Stream Convolutional Neural Networks and Image Fusion,” Image and Vision Computing, vol. 148, 105153, pp. 1-11, August 2024. DOI: 10.1016/j.imavis.2024.105153 [ISI indexed]
288. Le Sun, Mengqi Tang, and **Ghulam Muhammad**, “CABnet: A channel attention dual adversarial balancing network for multimodal image fusion,” Image and Vision Computing, vol. 147, 105065, pp. 1-11, July 2024. DOI: 10.1016/j.imavis.2024.105065 [ISI indexed]
287. Le Sun, Yiwen Hua, and **Ghulam Muhammad**, “Biometric Identity Recognition Based on Contrastive Positive-Unlabeled Learning,” Journal of Information Security and Applications, vol. 83, 103780, pp. 1-10, June 2024. DOI: 10.1016/j.jisa.2024.103780 [ISI indexed]
286. **Chintha Sri Pothu Raju**, Bala Chakravarthy, Neelapu, Rabul Hussain Laskar, and **Ghulam Muhammad**, “Analysis of multimodal fusion strategies in deep learning for ischemic stroke lesion segmentation on computed tomography perfusion data,” Multimedia Tools and Applications, 2024. DOI: 10.1007/s11042-024-19252-2 [ISI indexed]
285. Gundala Jhansi Rani, Mohammad Farukh Hashmi, and **Ghulam Muhammad**, “Variational Mode Decomposition and Empirical Wavelet Transform-Based Feature Extraction and Ensemble Classifier for Lower Limb Movement Prediction with Surface Electromyography Signal,” IEEE Access, vol. 12, pp. 55201-55217, April 2024. DOI: 10.1109/ACCESS.2024.3388913 [ISI indexed]

284. Le Sun, Jing Tian, and **Ghulam Muhammad**, “FedKC: Personalized Federated Learning with Robustness against Model Poisoning Attacks in the Metaverse for Consumer Health,” IEEE Transactions on Consumer Electronics, 2024. DOI: 10.1109/TCE.2024.3386932 [*ISI indexed*]
283. Milon Islam, Skeikh Nooruddin, Fakhri Karray, and **Ghulam Muhammad**, “Enhanced Multimodal Emotion Recognition in Healthcare Analytics: A Deep Learning based Model-Level Fusion Approach,” Biomedical Signal Processing and Control, vol. 94, 106241, pp. 1-13, August 2024. DOI: 10.1016/j.bspc.2024.106241 [*ISI indexed*]
282. Hamdan Al Jowair, Mansour Alsulaiman, and **Ghulam Muhammad**, “Multi-Focal Channel Attention for Medical Image Segmentation,” Expert Systems, e13588, vol. 41, no. 9, pp. 1-21, September 2024. DOI: 10.1111/exsy.13588 [*ISI indexed*]
281. Monica Dutta, Deepali Gupta, Sapna Juneja, Ali Nauman, and **Ghulam Muhammad**, “Comparative Growth Analysis of Onion in Deep Water Culture and Soil Based Systems: Enhancing Medicinal Plant Cultivation in Urbanized Environments,” IEEE Access, vol. 12, pp. 38202-38218, March 2024. DOI: 10.1109/ACCESS.2024.3373787 [*ISI indexed*]
280. Anichur Rahman, Md. Anwar Hussen Wadud, Md. Jahidul Islam, Dipanjali Kundu, T. M. Amir-Ul-Haque Bhuiyan, **Ghulam Muhammad**, and Zulfiqar Ali, “Internet of medical things and blockchain-enabled patient-centric agent through SDN for remote patient monitoring in 5G network,” Scientific Reports, 14:5297, pp. 1-19, March 2024. DOI: 10.1038/s41598-024-55662-w [*ISI indexed*]
279. Kranthi Kumar Singamaneni, **Ghulam Muhammad**, and Zulfiqar Ali, “A Novel Quantum Hash-Based Attribute-Based Encryption Approach for Secure Data Integrity and Access Control in Mobile Edge Computing-Enabled Customer Behavior Analysis,” IEEE Access, vol. 12, pp. 37378-37397, March 2024. DOI: 10.1109/ACCESS.2024.3373648 [*ISI indexed*]
278. Dipanjali Kundu, Md. Mahbubur Rahman, Anichur Rahman, Diganta Das, Umme Raihan Siddiqi, Md. Golam Rabiul Alam, Samrat Kumar Dey, **Ghulam Muhammad**, and Zulfiqar Ali, “Federated Deep Learning for Monkeypox Disease Detection on GAN-Augmented Dataset,” IEEE Access, vol. 12, pp. 32819 – 32829, February 2024. DOI: 10.1109/ACCESS.2024.3370838 [*ISI indexed*]
277. Le Sun, Huiyun Li, and **Ghulam Muhammad**, “Randomized Attention and Dual-path System for Electrocardiogram Identity Recognition,” Engineering Applications of Artificial Intelligence, vol. 132, 107883, pp. 1-10, June 2024. DOI: 10.1016/j.engappai.2024.107883 [*ISI indexed*]
276. Abdullah lakhan, Tor-Morten Groenli, **Ghulam Muhammad**, and Prayag Tiwari, “Evolutionary Meta-Heuristic Offloading and Scheduling Schemes Enabled Industrial Cyber-Physical System,” IEEE Systems Journal, vol. 18, no. 2, pp. 826-835, June 2024. DOI: 10.1109/JSYST.2023.3347523 [*ISI indexed*]
275. Le Sun, Wenzhang Dai, and **Ghulam Muhammad**, “Multi-level Graph Memory Network Cluster Convolutional Recurrent Network for Traffic Forecasting,” Information Fusion, vol. 105, 102214, pp. 1-10, May 2024. DOI: 10.1016/j.inffus.2023.102214 [*ISI indexed*]
274. M. Mottakin, Vidhya Selvanathan, Mohd Sukor Su'ait, Syaza Amira Razali, Md. Ariful Islam, Mohd Adib Ibrahim, **Ghulam Muhammad**, and Md. Akhtaruzzaman, “Enhancing

- pseudocapacitive energy storage system performance with electrodeposited CuS_x and CoS_x biphasic transitional metal sulfide (TMS) based nanostructured electrode on nickel foam,” *Journal of Physics and Chemistry of Solids*, Volume 186, 111795, pp. 1-12, March 2024. DOI: 10.1016/j.jpcs.2023.111795 [ISI indexed]
273. Zhiguo Qu, Yunyi Meng, **Ghulam Muhammad**, and Prayag Tiwari, “QMFND: A quantum multimodal fusion-based fake news detection model for social media,” *Information Fusion*, vol. 104, 102172, pp. 1-11, April 2024. DOI: 10.1016/j.inffus.2023.102172 [ISI indexed]
272. Le Sun, Jiancong Liang, and **Ghulam Muhammad**, “Distillate a sparse-meta time series classifier for open radio access network-based cellular vehicle-to-everything,” *IEEE Transactions on Vehicular Technology*, vol. 73, no. 7, pp. 9262-9271, July 2024. DOI: 10.1109/TVT.2023.3323279 [ISI indexed]
271. Kranthi Kumar Singamaneni, **Ghulam Muhammad**, and Zulfiqar Ali, “A Novel Multi-Qubit Quantum Key Distribution Ciphertext-Policy Attribute-Based Encryption Model to Improve Cloud Security for Consumers,” *IEEE Transactions on Consumer Electronics*, vol. 70, no. 1, pp. 1092-1101, February 2024. DOI: 10.1109/TCE.2023.3331306 [ISI indexed]
270. Prayag Tiwari, Lailei Zhang, Zhiguo Qu, and **Ghulam Muhammad**, “Quantum Fuzzy Neural Network for Multimodal Sentiment and Sarcasm Detection,” *Information Fusion*, vol. 103, 102085, pp. 1-14, March 2024. DOI: 10.1016/j.inffus.2023.102085 [ISI indexed]
269. Naseem Ahmad, **Ghulam Muhammad**, Kuldeep Singh Yadav, Rabul Hussain Laskar, Ashraf Hossain, and Zulfiqar Ali, “A cascaded deep learning framework for iris centre localization in facial image,” *Expert Systems*, vol. 41, no. 2, e13483, pp. 1-17, February 2024. DOI: 10.1111/exsy.13483 [ISI indexed]
268. Esraa Hassan, M. Shamim Hossain, Abeer Saber, Samir Elmougy, Ahmed Ghoneim, and **Ghulam Muhammad**, “A quantum convolutional network and ResNet (50)-based classification architecture for the MNIST medical dataset,” *Biomedical Signal Processing and Control*, Vol. 87, Part B, 105560, pp. 1-10, January 2024. DOI: 10.1016/j.bspc.2023.105560 [ISI indexed]
267. Ababil Islam Uday, Muhammad Aminur Rahaman, Md. Jahidul Islam, Anichur Rahman, Zulfiqar Ali, and **Ghulam Muhammad**, “4SQR-Code: A 4-State QR Code Generation Model for Increasing Data Storing Capacity in Digital Twin Framework,” *Journal of Advanced Research*, 2024. DOI: 10.1016/j.jare.2023.10.006 [ISI indexed]
266. Srikanth Jannu, Suresh Dara, Chaitanya Thuppari, Ankit Vidyarthi, Debjani Ghosh, Prayag Tiwari, and **Ghulam Muhammad**, “Energy Efficient Quantum-Informed Ant Colony Optimization Algorithms for Industrial Internet of Things,” *IEEE Transactions on Artificial Intelligence*, vol. 5, no. 3, pp. 1077 – 1086, March 2024. DOI: 10.1109/TAI.2022.3220186
265. Naveed Anwer Butt, Huda Gull, Zulfiqar Ali, **Ghulam Muhammad**, and Salman A. AlQahtani, “A Multi-Prefecture Study Applying Multivariate Approaches for Predicting and Demystifying Weather Data Variations Affect COVID-19 Spread,” *Information Systems and e-Business Management*, 2023. DOI: 10.1007/s10257-023-00636-0 [ISI index]
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24. Mansour Alsulaiman, Awais Mahmood, **Ghulam Muhammad**, Muhammad A. Bencherif, and Yousef A. Alotaibi, "A Technique to Overcome the Problem of Small Size Database for Automatic Speaker Recognition", Proc. The 5th International Conference on Digital Information Management (ICDIM 2010), (IEEE xplore) Lakehead University, Thunder Bay, Canada, July 05-08, 2010.
23. Mohammad Nurul Huda, **Ghulam Muhammad**, Mohammad Mahedi Hasan, Mohammed Rokibul Alam Kotwal, Gazi Md. Moshfiqul Islam, Md. Shahadat Hossain and Chowdhury

Mofizur Rahman, “Which one is dominant for neural network based speech recognition – Δ or $\Delta\Delta$ articulatory parameters?,” 2010 International Conference on Intelligent Computing and Cognitive Informatics (ICICCI 2010), (IEEE xplora), Kuala Lumpur, Malaysia, June, 2010.

22. Mohammad Nurul Huda, **Ghulam Muhammad**, Mohammad Mahedi Hasan, Sharif Mohammad Musfiqur Rahman, Foyzul Hassan and Mohammed Rokibul Alam Kotwal, “Effect of articulatory trajectories on phoneme recognition performance,” 2010 International Conference on Intelligent Computing and Cognitive Informatics (ICICCI 2010), (IEEE xplora), Kuala Lumpur, Malaysia, June, 2010.
21. **Ghulam Muhammad**, Yousef A. Alotaibi, Mansour Alsulaiman, and Mohammad Nurul Huda, “Environment Recognition Using Selected MPEG-7 Audio Features and Mel-Frequency Cepstral Coefficients”, Proc. the 5th International Conference on Digital Telecommunications (ICDT10), (IEEE xplora), pp. 11-16, Greece, June 13-19, 2010.
20. Mubarak O. AlQahtani, **Ghulam Muhammad**, and Yousef Ajami Alotaibi, “Environment Sound Recognition using Zero Crossing Features and MPEG-7”, Proc. the 3rd International Conference on the Applications of Web Information and Digital Technologies (ICADIWT 2010), Turkey, July 2010.

2009

19. Mansour Alsulaiman, **Ghulam Muhammad**, Yousef Alotaibi, Awais Mahmood, and Mohamed A. Bencherif, “Building a Speaker Recognition System with one Sample”, Proc. the 2nd Symposium International Computer Science and Computational Technology (ISCST '09), Huangshan, P. R. China, pp. 330-334, 26-28, December, 2009.
18. **Ghulam Muhammad** and Khaled Alghathbar, “Environment recognition from audio using MPEG-7 features,” Proc. The 4th International Conference on Embedded and Multimedia Computing (EM-Com09), (IEEE xplora), S. Korea, December, 2009.
17. **Ghulam Muhammad**, Yousef A. Alotaibi, and Mohammad Nurul Huda, "Automatic Speech Recognition for Bangla Digits," The 12th International Conference on Computer and Information Technology 2009 (ICCIT2009), (IEEE xplora), Bangladesh, December, 2009.
16. Mohammad Nurul Huda, Manoj Banik, **Ghulam Muhammad**, and Bernd J. Kroger, "Phoneme Recognition based on Distinctive Phonetic Features (DPFs) incorporating Syllable based Language Model," The 12th International Conference on Computer and Information Technology 2009 (ICCIT2009), (IEEE xplora), Bangladesh, December, 2009.
15. **Ghulam Muhammad**, Mubarak O. Al-Qahtani, and Khaled Alghathbar, “Environment recognition for digital audio forensics using MPEG-7 features and separate modeling technique,” The 10th International Workshop on Information Security Application (WISA09), Busan, S. Korea, Aug 25-27, 2009.
14. Yousef Ajami Alotaibi, Khondaker Abdullah-Al-Mamun, and **Ghulam Muhammad**, “Noise Effect of Saudi Accented Arabic Alphadigit in Automatic Speech Recognition,” Proc. The 2009 International Conference on Image Processing, Computer Vision, and Pattern Recognition (ICCV'09), Las Vegas, USA, July 13-16, 2009.

2008 and before

13. Yousef A. Alotaibi, Khondaker Abdullah-Al-Mamun, and **Ghulam Muhammad**, "Study on unique Pharyngeal and Uvular consonants in foreign accented Arabic," Proc. INTERSPEECH'08, pp. 751-754, Brisbane, Australia, September 2008.
12. Khondaker Abdullah-Al-Mamun and **Ghulam Muhammad**, "Improved noise reduction with pitch-enabled voice activity detection," Proc. IEEE 4th International Symposium on Image/Video Communications over fixed and mobile networks (ISIVC2008), Bilbao, Spain, July 2008.
11. **Ghulam Muhammad**, "Noise Robust Pitch Detection Based on Extended AMDF," Proc. The 8th IEEE International Symposium on Signal Processing and Information Technology (ISSPIT2008), (IEEE xplore), pp. 133-138, Sarajevo, December 2008.
10. Huda Mohammad Nurul, **Muhammad Ghulam**, Junsei Horikawa, and Tsuneo Nitta, "Distinctive Phonetic Feature (DPF) Based Phone Segmentation using Hybrid Neural Networks," Proc. INTERSPEECH'07, Antwerp, Belgium, August 2007.
09. Huda Mohammad Nurul, **Muhammad Ghulam**, Kouichi Katsurada, Yurie Iribe and Tsuneo Nitta, "Distinctive Phonetic feature (DPF) based phone segmentation using 2-stage multilayer neural networks," RISP International Workshop on Nonlinear Circuits and Signal Processing (NCSP'07), pp. 325-328, Shanghai, China, March 2007.
08. **Muhammad Ghulam**, Junsei Horikawa and Tsuneo Nitta, "Comparative study on contributions of pitch-synchronization and peak-amplitude towards robustness issue of ASR," Proc. INTERSPEECH'06, pp. 373-376, Pittsburgh, September 2006.
07. **Muhammad Ghulam**, Junsei Horikawa and Tsuneo Nitta, "A pitch-synchronous peak-amplitude based feature extraction method for robust ASR," Proc. IEEE International Conference on Acoustics, Speech and Signal processing (ICASSP'06), pp. I-505-508, Toulouse, France, May 2006.
06. Takashi Fukuda, **Muhammad Ghulam**, and Tsuneo Nitta, "Designing multiple distinctive phonetic feature extractors for canonicalization by using clustering technique," Proc. INTERSPEECH'05, pp. 3141-3144, Lisbon, September 2005.
05. **Muhammad Ghulam**, Takashi Fukuda, Junsei Horikawa, and Tsuneo Nitta, "Pitch-synchronous ZCPA (PS-ZCPA)-based feature extraction with auditory masking," Proc. IEEE ICASSP'05, pp. I-517-520, Philadelphia, March 2005.
04. **Muhammad Ghulam**, Takashi Fukuda, Junsei Horikawa, and Tsuneo Nitta, "A noise-robust feature-extraction method based on pitch-synchronous ZCPA for ASR," Proc. INTERSPEECH-ICSLP'04, vol. I, pp.133-136, Korea, October 2004.
03. **Muhammad Ghulam**, Takashi Fukuda, and Tsuneo Nitta, "Voice quality normalization in an utterance for robust ASR," Proc. Eurospeech'03, vol. III, pp. 2173-2176, Geneva, September 2003.
02. **Muhammad Ghulam**, Takashi Fukuda, Takaharu Sato, and Tsuneo Nitta, "Improving performance of an HMM-based ASR system by using monophone-level normalized confidence measure," Proc. ICSLP'02, vol.4, pp.2453-2456, Denver, September 2002.

01. Takaharu Sato, **Muhammad Ghulam**, Takashi Fukuda, and Tsuneo Nitta, “Confidence scoring for accurate HMM-based word recognition by using SM-based monophone score normalization,” Proc. IEEE ICASSP’02, pp. I-217-220, Orlando, March 2002.

Scholarships and Awards:

- Research Excellence Award 'Lifetime Achievement' (in the category of Economies of the Future) – 2024, by the Research Development and Innovation Authority (RDIA) and given by the H.E. Minister of Communications and Information Technology, Abdullah Alswaha.
- Best teaching faculty award for Computer Engineering department (2014-2015).
- Top quality research paper award (2018), I got three awards out of total eight awards throughout KSU.
- JSPS Post-Doctoral Research Fellowship from the Ministry of Education, Culture, Sports, Science and Technology (MONBUKAGAKUSHO), Japan for my outstanding research (acceptance rate: 14%) from April 2007.
- Scholarship awarded by MONBUKAGAKUSHO throughout MS and PhD courses, October 2000-March 2006.

Student’s Awards Under My Supervision:

- Ahmed Alnasheri, **First Prize**, The 7th meeting of KSU graduate research, 2016; *Title: Investigation of Frequency Regions for Voice Pathology Detection and Classification*. Advisors: Ghulam Muhammad and Mansour Alsulaiman
- Muneer Al-Hammadi, **First Prize**, The 10th meeting of KSU graduate research, 2019; *Title: Hand Gesture Recognition using Deep Learning Techniques*. Advisors: Ghulam Muhammad and Abdulwadood Abdulwaheed.
- Yazeed Khalid Musallam, Nasser Ibrahim AlFassam, and Khalid Saleh Alshehri, **First Prize**, AEC-KSU Best Graduation Project, 2021. *Title: Design of an electroencephalogram (EEG)-based motor imagery classification system*. Supervisor: Ghulam Muhammad
- Hamdi Altaheri, **First place** award for the best scientific paper in the King Saud University Scientific Forum for Research, Innovation and Talent, 2022. *Title: Attention-based deep learning techniques for decoding motor imagery EEG brain signals*. Advisor: Ghulam Muhammad
- Abdullah Khalid Albrethen, Khalid Bader Alharbi, and Mohammed Abdullah Alswayed, *Title: Design a hand rehabilitation system using a hand exoskeleton*, **Third Prize**, AEC-KSU Best Graduation Project, 2022. Supervisor: Ghulam Muhammad
- Waleed Albaqami, Muhannad Alanizy, Nasser Alzamil, *Title: NABT - Mobile Robot for Plant Disease Detection*, **First Prize**, 25th AEC-KSU Best Graduation Project, 2023. Supervisor: Ghulam Muhammad (<https://ccis.ksu.edu.sa/en/node/2227>)

Research Projects and Grants:

18. *Title:* Deep Learning based EEG Brain Control for Hand Rehabilitation of Stroke Patients

- Organization:* KSA International Collaboration Grant, Research and Development Office at the Ministry of Education, KSA
- Duration:* 2020-2022 (3 years)
- Responsibility:* Principal Investigator.
- Amount:* 1.6144 Million Saudi Riyals.
17. *Title:* A Framework for Arabic Media Mining and Information Extraction Using Continuous Domain Semantic Representation
- Organization:* KSA International Collaboration Grant, Research and Development Office at the Ministry of Education, KSA
- Duration:* 2020-2022 (3 years)
- Responsibility:* Co-Principal Investigator.
- Amount:* 1.8 Million Saudi Riyals.
16. *Title:* High Quality and Impact Research Initiative
- Organization:* Research and Development Office at the Ministry of Education, KSA
- Duration:* 2019-2020
- Responsibility:* Principal Investigator.
- Amount:* 90,420 Saudi Riyals per contract.
15. *Title:* Computer-Aided Pronunciation Training System for Non-native Learners of the Arabic Language
- Organization:* Grant Programs for Universities and Research Centers. (Project Number: 3-17-09-001-0003).
- Duration:* 2018-2020 (two years).
- Responsibility:* Co- Principal Investigator.
- Amount:* 750,000 Saudi Riyals.
14. *Title:* Multimodal Healthcare System Research Group.
- Organization:* KSU Deanship of Scientific Research. (RGP-1436-023)
- Duration:* 2015-2017 (two years).
- Responsibility:* Principal Investigator.
- Amount:* 150,000 Saudi Riyals per year.
13. *Title:* Automatic date fruit inspection system using local texture descriptor in different color spaces
- Organization:* Research Center, CCIS, KSU. (Project Number: RC140218).
- Duration:* 2014-2015 (one year).
- Responsibility:* Principal Investigator.
- Amount:* 30,000 Saudi Riyals.
12. *Title:* The design and analysis of 3D educational content for learning and memorization processes
- Organization:* KACST-KSU National Strategic Research Project Grant. (Project

- Number: 12-INF2582-02).
- Duration:* 2014-2016 (two years).
- Responsibility:* Co- Principal Investigator.
- Amount:* 1,825,000 Saudi Riyals.
11. *Title:* Automatic Voice Pathology Assessment
- Organization:* KACST-KSU National Strategic Research Project Grant. (Project Number: 12-MED2474-02).
- Duration:* 2013-2015 (two years).
- Responsibility:* Co- Principal Investigator.
- Amount:* 1,999,830 Saudi Riyals.
10. *Title:* Non-intrusive Image Forgery Detection using Multiresolution Framework.
- Organization:* KACST-KSU National Strategic Research Project Grant. (Project Number: 10-INF1140-02).
- Duration:* 2012-2013 (two years).
- Responsibility:* Principal Investigator.
- Amount:* 1,528,000 Saudi Riyals.
9. *Title:* Haptics-based Health Monitoring and Learning Research Group.
- Organization:* KSU Deanship of Scientific Research. (RGP-VPP-228)
- Duration:* 2013-2015 (two years).
- Responsibility:* Co- Principal Investigator.
- Amount:* 150,000 Saudi Riyals per year.
8. *Title:* Arabic Speaker Recognition.
- Organization:* KACST-KSU National Strategic Research Project Grant. (Project Number: 08-INF167-02)
- Duration:* 2011-2013 (two years).
- Responsibility:* Co-Principal Investigator.
- Amount:* 1,098,000 Saudi Riyals.
7. *Title:* Category specific face recognition.
- Organization:* KACST-KSU National Strategic Research Project Grant. (Project Number: 10-INF1044-02)
- Duration:* 2011-2013 (two years).
- Responsibility:* Co-Principal Investigator.
- Amount:* 1,295,000 Saudi Riyals.
6. *Title:* Automatic voice pathology detection based on MPEG-7 audio descriptors and support vector machine.
- Organization:* Research Center, CCIS, KSU. (Project Number: RC120910)
- Duration:* 2012-2013 (one year).

- Responsibility:* Principal Investigator.
Amount: 30,000 Saudi Riyals.
5. *Title:* Automatic voice pathology detection based on vocal tract area function.
Organization: Research Center, CCIS, KSU. (Project Number: RC121230)
Duration: 2013-2014 (one year).
Responsibility: Principal Investigator.
Amount: 30,000 Saudi Riyals.
4. *Title:* Environment detection for digital audio forensics.
Organization: Center of Excellence in Information Assurance, KSU.
Duration: 2009, six months.
Responsibility: Principal Investigator.
Amount: 60,000 Saudi Riyals.
3. *Title:* Pitch detection in noisy environments.
Organization: Research Center, CCIS, KSU. (Project Number: RC13/428-429)
Duration: 2008-2009 (one year).
Responsibility: Principal Investigator.
Amount: 30,000 Saudi Riyals.
2. *Title:* Study on canonicalization for robust speech recognition.
Organization: Japan Society for the Promotion of Science (JSPS), Ministry of Education, Culture, Sports, Science and Technology, Japan. (ID No. P 07080)
Duration: 2007-2009. (Shortened and completed)
Responsibility: JSPS Fellow.
1. *Title:* Feature extraction for noise-robust automatic speech recognition.
Organization: Toshiba Corporation, Japan.
Duration: 2006-2007.
Responsibility: Principal Researcher.

Professional Membership:

- International Speech Communication Association (ISCA). (4110)
- Acoustic Society of Japan (ASJ), (not active).
- IEEE, Senior Member. (91229298); IEEE Communications Society; IEEE Industrial Electronics Society; IEEE Instrumentation and Measurement Society; IEEE Signal Processing Society.
- Institute of Engineers, Bangladesh (IEB), Fellow. (F-13241)
- ACM, Member. (5060427)

Professional Activities:

- **Guest Editor**, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, SI: Perception-Driven Enhancement and Detection Methods for Remote Sensing Images in Non-Ideal Environments, 2025.
- **Guest Editor (lead)**, IEEE IoTJ, SI: Challenges and Opportunities of IoT-based Healthcare Industry 5.0, 2024-2025.
- **Guest Editor (lead)**, Information Fusion, SI: Internet of Medical Things (IoMT) Data Fusion, 2023.
- **Guest Editor (lead)**, IEEE Journal of Biomedical and Health Informatics, SI: Insights of Machine Learning into Medical Decision Making Systems: From Research to Practice, 2022.
- **Guest Editor**, IEEE Systems Journal, SI: Advanced Learning-based Support for Large-scale Multi-agent Systems, 2023-2024.
- **Guest Editor (lead)**, Sustainable Cities and Society SI: Internet of Health Things (IoHT)-based Connected Living for Sustainable Smart Cities, 2021.
- **Guest Editor**, Multimedia Systems SI: Deep Learning for Multimedia Healthcare, 2020.
- **Guest Editor**, ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM), SI: AI-empowered Multimedia Data Analytics for Smart Healthcare, 2020.
- **Guest Editor (lead)**, Special Issue on Computational Intelligence on Meta Learning for Smart Healthcare, IEEE Computational Intelligence Magazine, 2021-2022.
- **Area Editor**, Information Fusion (Top 2% journal), 2023 -
- **Editor**, IEEE Internet of Things Journal (Top 5% journal), 2023 -
- **Associate Editor**, Alexandria Engineering Journal, (Top 5% journal), 2023 -
- **Associate Editor**, IEEE Access, Q2
- **Editorial Board**, KSU CIS Journal (Q1), 2017 – 2024.
- **Associate Editor**, Expert Systems (Wiley; Q2), 2023 – present.
- **Associate Editor**, Connection Science (Taylor and Francis; Q2), 2024 -
- **Associate Editor**, International Arab Journal on Information Technology, 2011 – 2020
- IEEE Global Communications Conference (IEEE GLOBECOM), The Advances of The Internet of Things and Cloud for Smart Connected Living (Aiotcscl), 9-13 December 2019, Waikoloa, HI, USA
- The International IEEE Workshop on Multimedia Services and Technologies for Smart-health (MUST-SH 2020), London, UK, 2020.
- The International IEEE Workshop on Multimedia Services and Technologies for Smart-health (MUST-SH 2019), Hawaii, USA, 2019.
- The International IEEE Workshop on Multimedia Services and Technologies for Smart-health (MUST-SH 2018), San Diego, USA, 2018.
- The 7th International IEEE Workshop on Multimedia Services and Technologies for E-Health (MUST-EH), in conjunction with IEEE ICME, Hong Kong, 2017.
- Program committee member, KACSTIT2016, the 4th Saudi International Conference on Information Technology, November, Riyadh, Saudi Arabia.
- Advisory committee member, 1st International Conference on Advanced Information and Communication Technology 2016 (ICAICT 2016)
- The 6th International IEEE Workshop on Multimedia Services and Technologies for E-Health (MUST-EH), in conjunction with IEEE ICME, Seattle, USA, 2016.
- EUROCON 2015, Salamanca, Spain, 2015.

- The 5th International IEEE Workshop on Multimedia Services and Technologies for E-Health (MUST-EH), in conjunction with IEEE ICME, Torino, Italy, 2015.
- The second International Conference on Information Technology (ICIT14), Dubai, UAE, 2014.
- 10th International Symposium on Visual Computing (ISVC), Las Vegas, USA, 2014.
- 2013 IEEE Symposium on Computers and Informatics (ISCI 2013), Malaysia, 2013.
- The 3rd International IEEE Workshop on Multimedia Services and Technologies for E-Health (MUST-EH), in conjunction with IEEE ICME, San Jose, USA, 2013.
- 9th International Symposium on Visual Computing (ISVC), Crete, Greece, 2013.
- The 2nd International IEEE Workshop on Multimedia Services and Technologies for E-Health (MUST-EH), in conjunction with IEEE ICME, Melbourne, 2012.
- 2012 IEEE Symposium on Computers and Informatics (ISCI 2012), Malaysia, 2012.
- The First International Conference on Robot, Vision, and Signal Processing, Kaohsiung, Taiwan, 2011
- The 1st International IEEE Workshop on Multimedia Services and Technologies for E-Health (MUST-EH), in conjunction with IEEE ICME, Barcelona, 2011
- 2011 IEEE Symposium on Computers and Informatics (ISCI 2011), Malaysia, 2011.
- 2011 IEEE Symposium on Industrial Electronics and Applications (ISIEA 2011), Malaysia, 2011.
- 2011 IEEE International Conference on Signal and Image Processing Applications (ICSIPA 2011), Malaysia, 2011.
- 2011 IEEE Conference on Computer Applications and Industrial Electronics (ICCAIE 2011), Malaysia, 2011.
- 2010 IEEE Conference on Computer Applications and Industrial Electronics (ICCAIE 2010), Malaysia, 2010.