Mohammad Azam Khan

3, Pungdeokcheon-ro 171beon-gil (Room # 409), Suji-gu, Yongin-si, Gyeonggi-do, South Korea.

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Education

Korea University
Seoul, South Korea

PH.D. IN COMPUTER SCIENCE AND ENGINEERING — *Sep. 2016 - Feb. 2020*

- Supervisor: Jaegul Choo, Associate Professor, Graduate School of Artificial Intelligence, KAIST
- Thesis: Fault Detection and Classification of Short-Term Time-Series Data via Deep Neural Networks
- CGPA: 4.38/4.50

Bangladesh University of Engineering and Technology (BUET)
Dhaka, Bangladesh

M.ENGG. IN COMPUTER SCIENCE AND ENGINEERING — *May 2008 - Sep. 2013*

- Supervisor: Khaled Mahmud Shahriar, Assistant Professor, Department of Computer Science and Engineering, BUET.
- Thesis: Development of a phone based accountable customer support service solution for large enterprises using ASTERISK based open source IP-PBX system.
- CGPA: 2.95/4.0

International Islamic University Chittagong (IIUC)
Chittagong, Bangladesh

B.SC.ENGG. IN COMPUTER SCIENCE AND ENGINEERING — *Apr. 2004 - Feb. 2008*

- CGPA: 3.288/4.0

Skills

Expertise	Computer vision, Medical Image Analysis, Healthcare, Time Series Data Analytics
Programming	Python
Framework	PyTorch
Languages	Bengali, English, Korean

Work Experience

EnterTake Co., Ltd.
Seoul, South Korea

RESEARCH ENGINEER — *Jan. 2024 - Current*

- Development of a personalized service web & app platform based on cosmeceuticals.

Graduate School of Artificial Intelligence, KAIST
Daejeon, South Korea

POSTDOCTORAL FELLOW — *Dec. 2021 - Dec. 2023*

- Medical image analysis.
- Time series data analytics.

Dhaka Power Distribution Company Limited (DPDC)
Dhaka, Bangladesh

ASSISTANT/SUB-DIVISIONAL/EXECUTIVE ENGINEER — *Mar. 2009 - Nov. 2021*

- Present and support the IT Head and other top management in preparing IT strategies.
- Direct technological research by studying organization goals, strategies, practices of DPDC.
- Develop and implement necessary steps for the introduction of useful new technologies and ideas in DPDC.
- Meter reading snapshot validation via convolutional neural networks (CNNs).
- Maintains professional and technical knowledge by attending educational workshops, reviewing professional publications, and so on.

Department of Computer Science and Engineering, BUET
Dhaka, Bangladesh

TEACHING ASSISTANT — *Jun. 2008 - Mar. 2009*

- Worked under several senior faculty members and helped them perform various academic activities.
- Involved in a number of projects such as an SQL Query Judging System, and an SSO (Single-Sign-On) networking system for both Linux and Windows using LDAP and SAMBA implemented in the Department.

Publications

Journal

- Seong Ji Choi,* **Mohammad Azam Khan**,* Hyuk Soon Choi, Jaegul Choo, Jae Min Lee, and Soonwook Kwon, "Development of Artificial Intelligence System for Quality Control of Photo Documentation in Esophagogastroduodenoscopy," Surgical Endoscopy, 2021. (*: equal contributions)
- **Mohammad Azam Khan**,* Soonwook Kwon,* Jaegul Choo, Seok Min Hong, Sung Hun Kang, Il-Ho Park, Sung Kyun Kim, and Seok Jin Hong, "Automatic detection of tympanic membrane and middle ear infection from oto-endoscopic images via convolutional neural networks," Neural Networks 126 (2020) 384-394. (*: equal contributions)
- **Mohammad Azam Khan**, Jaegul Choo, and Yong-Hwa Kim, "Intelligent fault detection using raw vibration signals via dilated convolutional neural networks," Journal of Supercomputing (2018). doi: 10.1007/s11227-018-2711-0
- **Mohammad Azam Khan**, Yong-Hwa Kim and Jaegul Choo, "End-to-End Partial Discharge Detection in Power Cables via Time-Domain Convolutional Neural Networks," Journal of Electrical Engineering and Technology (2019), 14, 1299-1309.
- Sharib Ali, Felix Zhou, Barbara Braden, Adam Bailey, Suhui Yang, Guanju Cheng, Pengyi Zhang, Xiaoqiong Li, Maxime Kayser, Roger D. Soberanis-Mukul, Shadi Albarqouni, Xiaokang Wang, Chunqing Wang, Seiryo Watanabe, Ilkay Oksuz, Qingtian Ning, Shufan Yang, **Mohammad Azam Khan**, Xiaohong W. Gao, Stefano Realdon, Maxim Loshchenov, Julia A. Schnabel, James E. East, Georges Wagnieres, Victor B. Loschenov, Enrico Grisan, Christian Daul, Walter Blondel and Jens Rittscher, "An objective comparison of detection and segmentation algorithms for artefacts in clinical endoscopy," Scientific Reports (2020), 10 (1), 1-15.
- N. Kumar et al., "A Multi-Organ Nucleus Segmentation Challenge," in IEEE Transactions on Medical Imaging, vol. 39, no. 5, pp. 1380-1391, May 2020, doi: 10.1109/TMI.2019.2947628.

Conference

- Youngin Cho,* Daejin Kim,* Dongmin Kim, **Mohammad Azam Khan**, and Jaegul Choo, "WaveBound: Dynamic Error Bounds for Stable Time-Series Forecasting," Conference on Neural Information Processing Systems (**NeurIPS**), 2022.
- Youngin Cho,* Daejin Kim,* **Mohammad Azam Khan**, and Jaegul Choo, "Mining Multi-Label Samples from Single Positive Labels," Conference on Neural Information Processing Systems (**NeurIPS**), 2022.
- Youngin Cho, Junsoo Lee, Soyoung Yang, Juntae Kim, Yeojeong Park, Haneol Lee, **Mohammad Azam Khan**, Daesik Kim, and Jaegul Choo, "Guiding Users to Where to Give Color Hints for Efficient Interactive Sketch Colorization via Unsupervised Region Prioritization," Winter Conference on Applications of Computer Vision (**WACV**), 2023.
- Daejin Kim, **Mohammad Azam Khan**, and Jaegul Choo, "Not just Compete, but Collaborate: Local Image-to-Image Translation via Cooperative Mask Prediction," IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.
- Deepak Chandra Roy, Md Shazzad Hossain, Amit Kumar Das, Md. Ashraf Ali and **Mohammad Azam Khan**, "Towards Reliable Power Supply: An Approach to Low-cost IoT-based Power Interruption Monitoring System," International Conference on Big Data, IoT and Machine Learning (BIM 2021).
- Sultan Uddin Khan, Md Shazzad Hossain and **Mohammad Azam Khan**, "Green Energy from Cycle Rickshaws: A Novel Approach to Utilize the Impoverished Section of Bangladesh," International Conference on Green Energy, Computing and Sustainable Technology (GECOST), 2021.
- **Mohammad Azam Khan** and Khaled Mahmud Shahriar, "ASTERISK Based Open Source IP-PBX System for Accountable Customer Support Service," 3rd International Symposium on Computational and Business Intelligence, Bali, Indonesia, 2015. https://ieeexplore.ieee.org/document/7383542

Workshop

- S.A. Yoo*, **M.A. Khan***, J.H. Kim, J.Y. Hwa, S.M. Oh, J. Choo, K.H. Yang, J.T. Ahn, J.H. Lee, "Attention-based Mechanism for Acne Image Grading via Convolutional Neural Networks," Maui Derm Hawaii 2024 (Accepted) January 22-26, 2024. (*: equal contributions)
- Seong Ji Choi,* **Mohammad Azam Khan**,* Jin Hwa Park, Jae Hoon Yoon, Hong Sik Lee, Hoon Jai Chun, Jaegul Choo, Hyuk Soon Choi, "Development of a Video-Based Artificial Intelligence System for Enhanced Quality Control in Esophagogastroduodenoscopy," the 7th Korea Digestive and Disease Week 2023, Gut and Liver (KD, Volume 17 • Number 6 (Suppl. 1) November 2023. (*: equal contributions)
- **Mohammad Azam Khan** and Jaegul Choo, "Classification of cancer microscopic images via convolutional neural networks. In Lecture Notes in Bioengineering (pp. 141-147), 2019. doi: 10.1007/978-981-15-0798-4_15
- **Mohammad Azam Khan**, Yong-Hwa Kim and Jaegul Choo, "Intelligent fault detection via dilated convolutional neural networks," IEEE International Conference on Big Data and Smart Computing, Computer Society (2018), pp. 729-731.
- **Mohammad Azam Khan** and Jaegul Choo., "Multi-class artefact detection in video endoscopy via convolution neural networks," In Proceedings of the 2019 Challenge on Endoscopy Artefacts Detection (EAD2019), Venice, Italy, 8th April, volume 2366 of CEUR Workshop Proceedings. CEUR-WS.org, 2019.
- Seokwoo Jung, Sungha Choi, **Mohammad Azam Khan** and Jaegul Choo, "Towards Lightweight Lane Detection by Optimizing Spatial Embedding," Workshop on Perception for Autonomous Driving (ECCV 2020), arXiv: 2008.08311.

Ongoing Projects

Severity grading of acne vulgaris for automated clinical acne image analysis

This study leveraged an interdisciplinary collaboration between clinical dermatologists and artificial intelligence (AI) researchers to develop an algorithm to automatically evaluate acne lesions using digital image analysis for acne severity assessment and treatment outcome monitoring. The initial results of our work have been presented at Maui Derm Hawaii 2024 held on January 2024. The developed model is under internal testing at EnterTake Co., Ltd., which is a start-up company based on AI-powered skin analysis technology.

Real-time or near real-time video analysis of EGD procedure

We have developed a quality control AI model for a continuous video recording of the esophagogastroduodenoscopy (EGD) to look for abnormal lesions. We attempt to design a video analytics AI system to guarantee quality control of an EGD procedures through this study. The preliminary results of the study unveiled at the Korea Digestive Disease Week 2023.

Industrial Innovations

Meter Reading Snapshot Validation using CNNs

We developed and deployed an automated image validation process for DPDC using CNNs to identify and eventually to resolve the complaint against meter readers of not visiting customers' premises to log the energy consumption properly. We leverage a state-of-the-art CNN architecture to detect such useful images using a transfer learning mechanism and handed over the technology to the organization. This work has received a national ICT award in Bangladesh under two different categories: (i) Research & Development (R&D), and (ii) Technology (Artificial Intelligence). This is a potential solution for image-based automatic meter reading, specifically for developing countries like Bangladesh.

Low-cost IoT-based Power Interruption Monitoring System

We propose a low-cost IoT-based solution to automatically evaluate two standard key performance indicators (KPIs) for the continuation of power supply in a distribution network. Additionally, we have developed a web-based real-time power interruption monitoring system (PIMS) for further power outage analysis, strategic decision-making, and improved customer service. Importantly, this work has received a national ICT award under the digital government category in 2020 in Bangladesh.

Open Source IP-PBX System for Accountable Customer Support Service

Traditionally, legacy phone-based PBX systems are deployed to provide customer support service, where operators are appointed to receive calls and respond to customers' queries or complaints. Unfortunately, such a system severely lacks accountability from support service personnel. There are often cases where the operator is not at his desk while the phone is ringing or may deliberately leave the phone unattended, misbehaving with customers, not registering complaints and doing the necessary follow-ups, and so on. There is very little system support for the management to monitor and track such inappropriate conducts from the support service employees. However, replacing the legacy PBX system with an IP-PBX system will enable all of these desirable features. We developed and deployed such a system for customer support service at DPDC using an Asterisk-based open-source IP-PBX system. DPDC is a power distribution service provider in Bangladesh, with 1.5 million customers in its electricity distribution network. DPDC provides support services for a large portion of its customers through this channel now.

Honors & Awards

2021	**1st Place (Role: Advisor),** HeLP Challenge 2021 (Brain Tumor Segmentation)	*Seoul, South Korea*
2021	**Champion - Research and Development,** National ICT Awards 2020	*Dhaka, Bangladesh*
2021	**Winner - Technology (Artificial Intelligence),** National ICT Awards 2020	*Dhaka, Bangladesh*
2018	**2nd Place (Awarded KRW 1,000,000),** HeLP Challenge 2018 (Ch1: Brain Tumor Segmentation)	*Seoul, South Korea*
2015	**9th place,** Daffodil Japan IT Online Quiz Contest	*Dhaka, Bangladesh*
2009	**Nationwide one of the ten top scorers (Awarded BDT 100,000),** ACI Pure Salt Deshke Jano Quiz Contest	*Dhaka, Bangladesh*
2007	**18th Place,** The ACM Asia Programming Contest (ICPC Dhaka site)	*Dhaka, Bangladesh*

Selected Competitions

Brain Tumor Segmentation (Advisor) *11/2021*

HeLP Challenge 2021, Asan Medical Center, Seoul, South Korea

- Position: 1st place.
- Competition site: Internal (Private connection through VPN only)

Brain Tumor Segmentation *3/2019*

HeLP Challenge 2018, Asan Medical Center, Seoul, South Korea

- Position: 2nd place among 11 teams.
- Competition site: https://www.synapse.org/#!Synapse:syn15569329/wiki/582412

Multi-class artefact detection in video endoscopy *3/2019*

Artefact detection Challenge (EAD 2019), ISBI 2019

- Position: 10th place among 29 actively participated teams.
- Competition site: https://ead2019.grand-challenge.org/

Classification of leukemic B-lymphoblast cells from normal B-lymphoid precursors from blood smear microscopic images *3/2019*

Classification of Normal vs Malignant Cells in B-ALL White Blood Cancer Microscopic Images, ISBI 2019

- Position: 12th place among 25 teams allowed for final round.
- Competition site: https://competitions.codalab.org/competitions/20395

RSNA Pneumonia Detection Challenge *10/2018*

Kaggle

- Position: 62/1499 (Top 5%)
- Competition site: https://www.kaggle.com/c/rsna-pneumonia-detection-challenge

Mercedes-Benz Greener Manufacturing *7/2017*

Kaggle

- Position: 73/3835 (Top 2%)
- Competition site: https://www.kaggle.com/c/mercedes-benz-greener-manufacturing

Intel & MobileODT Cervical Cancer Screening *6/2017*

Kaggle

- Position: 38/848 (Top 5%)
- Competition site: https://www.kaggle.com/c/intel-mobileodt-cervical-cancer-screening

Invited Presentations

Department of Computer Science and Engineering, IIUC *Chittagong, Bangladesh*

Presenter for introducing recent trends of computer science *Feb. 2017*

- Recent trends in Computer Science and Engineering.
- Introduced big data analytics, deep learning, IoT.

Travel Grants

ARTEFACT DETECTION CHALLENGE (EAD 2019), ISBI 2019 *Venice, Italy*

Presenter for Multi-class artefact detection in video endoscopy *Mar. 2019*

- Supported by: University of Oxford and MedIAN (https://www.median.ac.uk/)
- Featured interview: `https://www.median.ac.uk/blog/conversation-travel-grant-recipient-mohammad-azam-khan-\ieee-isbi-ead2019-challenge`

Research Community Service

Conference Reviewing (Partial)

2021-24 Neural Information Processing Systems (NeurIPS)
2022-24 International Conference on Learning Representations (ICLR)
2022-24 International Conference on Machine Learning (ICML)
2019-20 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
2018-20 Asian Conference on Machine Learning (ACML)
2018-19 Medical Image Computing and Computer Assisted Interventions (MICCAI)
2018 IEEE International Conference on Big Data and Smart Computing

Journal Reviewing (Partial)

2021 Journal of Computers and Information Technology
2020 Artificial Intelligence In Medicine
2020 Scientific Reports
2019 The Journal of Supercomputing
2018-19 IEEE Transactions on Visualization and Computer Graphics (TVCG)
2018-19 ACM Transactions on Interactive Intelligent Systems (TiiS)

Extracurricular Activity

General Secretary *Chittagong, Bangladesh*

Computer Club at IIUC *Mar. 2007 - Feb. 2008*

- Successfully planned, organized and executed major events - programming contest, software contest, quiz contest, open source campaign, math olympiad, seminar, workshop, IT debate, and IT festival etc.
- Conducted workshops on ACM programming contest and taught junior students to increase problem-solving capabilities by developing examples and answering questions.
- Led executive meetings and planned the strategic development and goals of the club.

References

- Provided upon request.