Numan Saeed

• Email: numansaeed.pk@gmail.com • Google Scholar
• LinkedIn • GitHub

Research Interests

AI for Healthcare, Machine Learning, Data Science, MEMS Transducers.

Education

2021 - Present: Doctor of Philosophy in Machine Learning

Mohamed bin Zayed University of Artificial Intelligence, Abu Dhabi

Courses: Machine Learning, Artificial Intelligence, Medical Imaging: Physics and analysis, Probabilistic and Statical inference.
Advisors: Mohammad Yaqub, Karthik Nandakumar and Bin Gu
Thesis Topic: Deep Learning for Cancer Diagnosis and Prognosis
Teaching Assistant: Machine Learning and Deep Learning courses
Awards: Full sponsorship for the PhD program

2015 - 2016: Masters in Microsystems

Masdar Institute of Science and Technology, Abu Dhabi

Advisor: Jaime Viegas
Thesis Title: Characterization of Piezoelectric Micromachined Ultrasonic Transducers in Electrical, Mechanical and Acoustic Domain.
Thesis Committee: Jaime Viegas, Ibrahim Elfadel and Jerald Yoo
Sponsors and Collaborators: Global Foundries, Mubadala.
Awards: Full sponsorship for the MSc program

2009 - 2013: Bachelors in Electrical Engineering

National University of Computer and Emerging Sciences, Islamabad

Advisor: Zar Khitab
Awards: Awarded Gold Medal, Silver Medal and Bronze Medal in semesters of Fall 2011, Spring 2012 and Fall 2012 respectively. Inscribed five time in Dean's list of Honors and once in Rector's list of Honors.

Experience

2021 - Present: Graduate Assistant, MBZUAI, Abu Dhabi

- Worked on predicting patient outcomes, namely progression-free survival from the CT and PET images and available clinical data.
- Segmentation of primary tumor and lymph nodes of head and neck cancer patient using PET/CT images.
- Classification of the presence of MGMT promoter genetic from MRI scans.
- Worked as TA for Machine Learning and Deep Learning courses.

2019 - 2020: Senior Analytics Specialist, Etihad Airways, Abu Dhabi

- Time series-based forecasting for passenger bookings and ancillary revenue using classical methods, 1D-CNN and LSTM
- Econometric models to explain business levers affecting bookings (marketing, pricing, trade)
- Developed an engagement score metric for customer classification using kNN.
- Performed latency analysis to assess the impact of events on customers' engagement.
- Developed a mobile app for internal use that utilizes web-scrapping routines for news collection on aviation.
- Maintained proficiency with advanced analytic and database tools and in-house data sets.
- Summarized and visualized results and highlighted likely insights for the business translator

2015 - 2019: Research Assistant/Engineer, Masdar Institute of Science and Technology

Infrared Thermography:

- Worked on infrared based non-destructive testing of composite structures in collaboration with Strata Manufacturing, Global Foundries and IME Singapore.
- Employed CNN to automatically detect defects in composite structures through thermogram images.
- Used deep neural networks for estimating the defects depth in composites.
- Designed and printed 3D composite structures
- Supervised graduate students.

MEMS:

- Designed MEMS devices (accelerometers and gyroscopes) for space-related applications
- Performed mechanical and electrical characterization on the fabricated accelerometers and gyroscopes.
- Conducted simulation and characterization of a MEMS device called Piezoelectric Micromachined Ultrasonic Transducers (PMUTs) used in gesture recognition and fingerprint identification respectively.
- Developed the experimental characterization setup for the mechanical, electrical and acoustic domains.
- Assessed the quality of fabrication procedures.

2013 - 2014: Research Assistant, Comsats institute of Information Technology

- Assessed the reliability of RFID tags by using MIMO techniques in a unique way.
- Planned to increase the range of passive RFID tag by allowing multiple RFID tags to respond at the same time.

Projects

Self-Supervised Learning methods for medical data: Used Barlow twins and MoCo to pretrain models on CheXpert for a downstream task of VQA in the medical domain (ImageCLEF).
ML model for medical treatment: GradCAM was used to interpret a Chest X-ray diagnostic model. Shapley and Permutation method were used to know which features are important.
Natural Language Entity Extraction: Extracting disease labels from clinical reports and using BERT model to extract answers from medical reports.
Estimating Treatment Effect Using Machine Learning: Machine learning techniques are used to determine when a treatment will have greater treatment effect for a particular patient.
Brain Tumor Auto-Segmentation for MRI: A 3D U-Net neural network model was used to automatically segment tumor regions in brain, using MRI (Magnetic Resonance Imaging) scans.
Cox-Proportional-Hazards-and-Random- Survival-Forests: A combination of linear and non-linear techniques and survival data is used to develop a risk model. The goal is to understand the effect of different factors on the survival of Primary Biliary Cirrhosis patients.
Chest X-Ray Medical Diagnosis with Deep Learning: A DenseNet121 neural network model was used to diagnose any of the 14 predefined diseases using Chest Xray.

Publications

Conference Proceedings

- Numan Saeed, Ikboljon Sobirov, Roba AlMajzoub, and Mohammad Yaqub. “TMSS: An End-to-End Transformer-based Multimodal Network for Segmentation and Survival Prediction”. International Conference on Medical Image Computing and Computer-Assisted Intervention. Springer, Cham, 2022.
- Ikboljon Sobirov, Numan Saeed, and Mohammad Yaqub. “Segmentation with Super Images: A New 2D Perspective on 3D Medical Image Analysis”. (In Submission)
- Numan Saeed, Shahad Al Hardan, Kudaibergen Abutalip, and Mohammad Yaqub. “Is it Possible to Predict MGMT Promoter Methylation from Brain Tumor MRI Scans using Deep Learning Models?”. (Accepted in MIDL 2022)
- Numan Saeed, Roba Al Majzoub, Ikboljon Sobirov, and Mohammad Yaqub. “An Ensemble Approach for Patient Prognosis of Head and Neck Tumor Using Multimodal Data”. 3D Head and Neck Tumor Segmentation in PET/CT Challenge, pp. 278-286. Springer, Cham, 2021.
- Alabi Bojesomo, Numan Saeed, and Ibrahim M Elfadel. “A multiband RF MEMS switch with low insertion loss and CMOS-compatible pull-in voltage”. In: 2018 Symposium on Design, Test, Integration & Packaging of MEMS and MOEMS (DTIP). IEEE. 2018, pp. 1–4.
- Shadi Khazaaleh, Numan Saeed, Inas Taha, Mateusz T Madzik, and Jaime Viegas. “Piezoelectric micromachined ultrasonic transducers and micropumps: from design to optomicrofluidic applications”. In: Microfluidics, BioMEMS, and Medical Microsystems XV. vol. 10061. International Society for Optics and Photonics. 2017, 100610S.
- J Tillak, Numan Saeed, S Khazaaleh, and J Viegas. “pMUT+ ASIC integrated platform for wide range ultrasonic imaging”. In: Photons Plus Ultrasound: Imaging and Sensing 2017. Vol. 10064. International Society for Optics and Photonics. 2017, 100644W.
- MS Javaid, Numan Saeed, AT Al-Awami, and Zorays Khalid. “Stochastic versus Robust Optimization of wind-hydro power plant’s operational strategy”. In: Multi-Topic Conference (INMIC), 2016 19th International. IEEE. 2016, pp. 1–5.
- Shahzad Muzaffar, Numan Saeed, and Ibrahim M Elfadel. “Automatic protocol configuration in single-channel low-power dynamic signaling for IoT devices”. In: Very Large Scale Integration (VLSI-SoC), 2016 IFIP/IEEE International Conference on. IEEE. 2016, pp. 1–6.
- M Behzad, Nadeem Javaid, A Sana, Mahmood Ashraf Khan, Numan Saeed, Zahoor Ali Khan, and Umar Qasim. “Tsddr: Threshold sensitive density controlled divide and rule routing protocol for wireless sensor networks”. In: Broadband and Wireless Computing, Communication and Applications (BWCCA), 2014 Ninth International Conference on. IEEE. 2014, pp. 78–83.

Journal Articles

- DA Derusova, VP Vavilov, AO Chulkov, BI Shagdirov, Numan Saeed, and M Omar. “Evaluating impact damage in Kevlar/carbon composites by using laser vibrometry and active infrared thermography”. In: Electronics Letters (2020).
- Waqas Amin Gill, Dima Ali, Boo Hyun An, Wajih U Syed, Numan Saeed, Muneera Al-shaibah, Ibrahim M Elfadel, Sultan Al Dahmani, and Daniel S Choi. “MEMS multi-vibrating ring gyroscope for space applications”. In: Microsystem Technologies (2020), pp. 1–7.
- A.O. Chulkov, S. Sfarra, Numan Saeed, J. Peeters, Ibarra-Castanedo C., G. Gargiulo, G. Steenackers, X.P.V. Maldague, M.A. Omar, and V. Vavilov. “Evaluating quality of marquetries by applying active IR thermography and advanced signal processing”. In: Journal of Thermal Analysis and Calorimetry (2020), pp. 1–14.
- Numan Saeed, Nelson King, Zafar Said, and Mohammed A Omar. “Automatic Defects Detection in CFRP Thermograms, using Convolutional Neural Networks and Transfer Learning”. In: Infrared Physics & Technology (2019), p. 103048.
- AO Chulkov, DA Nesteruk, VP Vavilov, AI Moskovchenko, Numan Saeed, and M Omar. “Optimizing input data for training an artificial neural network used for evaluating defect depth in infrared thermographic nondestructive testing”. In: Infrared Physics & Technology (2019), p. 103047.
- Numan Saeed, Houda Al Zarkani, and Mohammed A Omar. “Sensitivity and Robustness of Neural Networks for Defect-Depth Estimation in CFRP Composites”. In: Journal of Nondestructive Evaluation 38.3 (2019), p. 74.
- Wajih U Syed, Boo Hyun An, Waqas Gill, Numan Saeed, Muneera S Al-Shaibah, Sultan Al Dahmani, Daniel S Choi, and Ibrahim M Elfadel. “Sensor Design Migration: The Case of a Vibrating Ring Gyroscope”. In: IEEE Sensors Journal (2019).
- Numan Saeed, Yusra Abdulrahman, Saed Amer, and Mohammed A Omar. “Experimentally validated defect depth estimation using artificial neural network in pulsed thermography”. In: Infrared Physics & Technology 98 (2019), pp. 192–200.
- Numan Saeed, Mohammed A Omar, and Yusra Abdulrahman. “A Neural Network Approach for Quantifying Defects Depth, for Nondestructive Testing Thermograms”. In: Infrared Physics & Technology (2018).
- Numan Saeed, Mohammed A Omar, Yusra Abdulrahman, Sultan Salem, and Ahmad Mayyas. “IR Thermographic Analysis of 3D Printed CFRP Reference Samples with Back-Drilled and Embedded Defects”. In: Journal of Nondestructive Evaluation 37.3 (2018), p. 59.

Awards

2022 Awarded the student travel award for MICCAI 2022 conference
2021 Awarded the first position in HECKTOR 2021 challenge at MICCAI conference
2021 Awarded Graduate Student Fellowship for PhD. at Mohamed Bin Zayed University of Artificial Intelligence
2019 Appreciation certificate awarded by the vice president of commercial and sales at Etihad Airways for excellent performance during COVID19 pandemic.
2017 Jointly signed certificate by MIT and Masdar Institute in conjunction with the master's degree.
2015 Awarded Graduate Student Fellowship for Masters at Masdar Institute of Science and Technology
2014 Selected for “Faculty Development at University of Illinois at Urbana-Champaign (UIUC), USA.” Project.

Skills and Tests

Programing: Python, C++, MATLAB, SQL

Frameworks: PyTorch, PyTorch Lightening, Keras, TensorFlow

Packages: Pandas, NumPy, scikit-learn, lifelines

Extracurricular activities

I love playing cricket, reading history books and travelling.

Referee’s are available on request