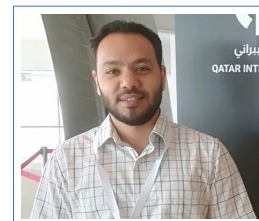


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Research Interests

Conversational long-form speech translation, multilingual and code-switching, self-supervised learning, neural audio codecs, multimodal representation learning.

Education

- 2021–present **PhD, Electrical & Computer Engineering, Johns Hopkins University.**
Courses: Natural Language Processing, Audio Signal Processing, Machine Translation, Information Extraction from Speech and Text, Speech and Audio Processing by Humans and Machines
- 2018–2020 **Master of Engineering, Electrical & Computer Engineering, American University of Beirut.**
Thesis: Domain Adaptation with Representation learning for Time Series.
Courses: System Identification, Numerical Optimization, Advanced Data Mining Applications, Biomedical Signals and Image Processing
- 2012–2017 **Bachelor of Engineering, Electrical & Computer Engineering, University of Khartoum.**
Thesis: Autopilot Design for a Quadcopter.
Core courses: Digital Signal Processing, Microcomputer System Design, Linear Control, Digital Image Processing, Artificial Intelligence

Publications

- 2025 **Hussein A**, Khurana S, Germain F, Le Roux J. Disentangling Acoustic and Semantic Representations in Pretrained Speech Models. Preparing for Interspeech.
- 2024 **Hussein A**, Yan B, Anastasopoulos A, Watanabe S, Khudanpur S. Enhancing End-to-End Conversational Speech Translation Through Target Language Context Utilization. ICASSP.
- 2024 **Hussein A**, Raj D, Wiesner M, Povey D, Garcia P, Khudanpur S. Enhancing Neural Transducer for Multilingual ASR with Synchronized Language Diarization. Interspeech.
- 2024 **Hussein A**, Zeinali D, Klejch O, Wiesner M, Yan B, Chowdhury S, Ali A, Watanabe S, Khudanpur S. Speech collage: code-switched audio generation by collaging monolingual corpora. ICASSP.
- 2023 **Hussein A**, Xiao C, Verma N, Thebaud T, Wiesner M, Khudanpur S. JHU IWSLT 2023 Dialect Speech Translation System Description. Proceedings of the 20th International Conference on Spoken Language Translation (IWSLT), 2023
- 2022 Yang J, **Hussein A**, Wiesner M, Khudanpur S. JHU IWSLT 2022 Dialect Speech Translation System Description. In Proceedings of the 19th International Conference on Spoken Language Translation (IWSLT 2022) 2022 May (pp. 319-326).
- 2022 **Hussein A**, Chowdhury SA, Abdelali A, Dehak N, Ali A, Khudanpur S. Textual data augmentation for Arabic-English code-switching speech recognition. In 2022 IEEE Spoken Language Technology Workshop (SLT) 2023 Jan 9 (pp. 777-784). IEEE.
- 2022 **Hussein A**, Watanabe S, Ali A. Arabic speech recognition by end-to-end, modular systems and human. Computer Speech & Language. 2022 Jan 1;71:101272.
- 2021 Chowdhury SA, **Hussein A**, Abdelali A, Ali A. Towards one model to rule all: Multilingual strategy for dialectal code-switching Arabic Asr. In Interspeech, 2021.

- 2021 Ali A, Chowdhury SA, **Hussein A**, Hifny Y. Arabic Code-Switching Speech Recognition Using Monolingual Data. In Proc. Interspeech 2021, pages 3475–3479, 2021.

Research Experience

Research Assistant at Johns Hopkins

Aug, 2021 – **Conversational ST/Code-switched ASR.**

- present
- Developed bridged back-translation to reduce covariate shift from Standard Arabic to Tunisian dialect.
 - Utilized pretrained ASR and MT models in speech translation by finetuning them in E2E fashion. Employed a system combination approach utilizing Minimum Bayes-Risk decoding.
 - Introduced a context-aware E2E-ST framework that leverages context in the target language improving translation relevance and coherence.
 - Developed novel data augmentation approaches for code-switching speech recognition using monolingual resources, addressing the challenge of data scarcity.

Advisor : **Sanjeev Khudanpur**, ([Personal Web-page](#))

Mitsubishi Electric Research Laboratories (Internship)

May,2024 – **Disentangling Acoustic and Semantic Representations in Neural Audio Codecs.**

- Sep,2024
- Developed a novel framework combining self-supervised learning (SSL) with reconstruction objectives to learn disentangled and discretized acoustic and semantic representations in neural audio codecs.).

Mentor : **Sameer Khurana**, ([Personal Web-page](#))

Qatar Computing Research Institute

June,2020 – **ASR modeling for multidialectal Arabic and Arabic-English Code-switching.**

- Aug,2021
- Pioneered the development of the first E2E transformer-based ASR for Arabic language with a novel VAD pipeline to handle long-form speech setting a new benchmark in performance.
 - Worked on developing techniques for Arabic-English code-switching ASR utilizing monolingual data (multigraph WFST with Kleene closure, multilingual-multidialectal code-switching).

Mentor : **Ahmed Ali**, ([Personal Web-page](#))

Research Assistant at American University of Beirut

Feb,2018 – **Transfer learning approaches for the Internet of Things (IoT) and sensing analytics.**

- May,2020
- Developed machine learning models for emotion recognition from physiological signals (ECG, EEG, GSR).
 - Developed a novel domain adaptation approach utilizing semi-supervised learning to adapt to unlabeled data with a different distribution
 - Proposed a novel EEG data augmentation with adversarial training for Seizure prediction.

Advisor : **Hazem Hajj**, ([Personal Web-page](#))

Zaka.ai

July,2020 – **AI Education Instructor.**

Dec,2020 Developed online education material for Artificial Intelligence

Mentor : **Christophe Zoghbi**, ([Personal Web-page](#))

Fellowships & Awards

- 2024-2025 **JHU+Amazon AI2AI fellowship**, PhD fellowship that supports innovative research in Artificial Intelligence
- 2018-2020 **AI Ghurair Graduate STEM Scholarship Award**, full scholarship as outstanding student in Arab region covering Masters degree
- Jan, 2019 **Big Data AI Hackathon**, first place in multi-class song genre classification sponsored by Anghami
- Oct, 2019 **Qatar International Fake News Detection**, first place in fake news detection from low resource text sponsored by Qatar Airways. [link](#)
- June, 2021 **Indic code-switching challenge**, third place in code-switched ASR. [link](#)

Languages

Bilingual Arabic/Ukrainian
Proficient English

Skills

Programming: Python, PyTorch, Tensorflow, Shell scripting, Matlab

Toolkits: Espnet, Kaldi, Git, Next-gen Kaldi (K2 Lhotse, Icefall), Fairseq