Md Tamzeed Islam

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Education

University of North Carolina at Chapel Hill
- Ph.D. in Computer Science [Expected graduation date: May, 2021]
- Research Area: **Sensing & Ubiquitous Computing, Applied Machine Learning, Acoustic Signal Processing.**

Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh
- B.Sc. in Computer Science and Engineering
- CGPA: 3.85 on a scale of 4, Major CGPA: 3.92
- Awards: Dean's List, University Merit Scholarship.

Professional Experience

Applied Scientist Intern, Amazon Lab 126, May 2020–August 2020.

- **Mentor:** Dr. Anshuman Ganguly

- Developed deep neural network for sound event detection and localization.

Summer Research Intern, Microsoft Research Redmond, May 2019–August 2019.

- **Mentor:** Dr. Ivan Tashev

- Worked on estimation of human *anthropometric features* with embedded sensors on headphone for Head Related Transfer Function(HRTF) personalization.

Summer Research Intern, Bosch USA, May 2018–August 2018.

- **Mentor:** Dr. Sirajum Munir

- Worked as **Sensor Fusion Localization Intern.**

- Implemented a customer *localization* system by fusing *WiFi Channel State Information, Mobile sensors and Camera data*.

Publications

- **Islam, MT**, Tashev, I, Anthropometric Features Estimation Using Integrated Sensors on a Headphone for HRTF Personalization. *Audio Engineering Society Conference: 2020 AES International Conference on Audio for Virtual and Augmented Reality (AES AVAR)..*

- **Islam, MT**, Nirjon, S, Wi-Fringe: Leveraging Text Semantics in WiFi CSI-Based Device-FreeNamed Gesture Recognition. *In the International Conference on Distributed Computing in Sensor Systems (DCOSS '20), Los Angeles, CA, May 2020, 12 pg.*

- **Islam, MT**, Nirjon, S, SoundSemantics: Exploiting Semantic Knowledge in Text for Embedded Acoustic Event Classification. *In Proc. of the 18th ACM/IEEE International Conference on Information Processing in Sensor Networks **(IPSN '19), 12 pg***.

- **Islam, M.T.**, Islam, B. and Nirjon, S., SoundSifter: Mitigating Overhearing of Continuous Listening Devices. *In Proc. of 15th ACM International Conference on Mobile Systems, Applications, and Services **(MobiSys '17)**.*

- **Islam, MT**, Islam, B, Nirjon, S, Duty-Cycle-Aware Real-Time Scheduling of Wireless Links in Low Power WANs. *In Proc. of 14th annual International Conference on Distributed Computing in Sensor Systems **(DCOSS '18)**, 8 pg, NY*, 2018.

- Islam, B, **Islam, MT**, Nirjon, S, Glimpse.3D: A Motion-Triggered Stereo Body Camera for 3D Experience Capture and Preview. *In Proc. of the 17th ACM/IEEE International Conference on Information Processing in Sensor Networks **(IPSN '18)**, 12 pg, Porto, Portugal*, 2018.

- de Godoy, D, Islam, B, Xia, S, **Islam, MT**, Chandrasekaran, R, Chen, YC, Nirjon, S, Kinget, PR, Jiang, X, PAWS: A Wearable Acoustic Systemfor Pedestrian Safety. *In Proc. of the 3rd ACM/IEEE International Conference on Internet of Things Design and Implementation **(IoTDI '18)**.*, 2018.

- Srinivasan, R., **Islam, M.T.**, Islam, B., Wang, Z., Sookoor, T., Gnawali, O. and Nirjon, S., Preventive Maintenance of Centralized HVAC Systems: Use of Acoustic Sensors, Feature Extraction, and Unsupervised Learning. In The 15th International Conference of Building Simulation **(IBPSA)**

- Islam, M.S., Ali, M., Zubaer, K.H., Sarmin, S., Islam, M.T., Islam, B., Al Islam, A.A. and Sadri, A.M. (2017, January). Trusted Worrier: A low-cost and high-accuracy user authentication system for firearm exploiting dynamic hand pressure biometrics. In Networking, Systems and Security **(NSysS)**, 2017 International Conference on (pp. 87-95). IEEE.

- **Islam, M.T.**, Islam, B. and Ali, M.E., A System for Identifying and Visualizing Influential Communities. *Workshop on Social Data Analytics and Management, **VLDB'16**.*

Demo

- Islam, B, **Islam, MT**, Nirjon, S, Demo Abstract: A Motion-Triggered Stereo Camera for 3D Experience Capture. *In Proc. of the 17th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN '18), Porto, Portugal*, 2018.

- Chandrasekaran, R., de Godoy, D., Xia, S., **Islam, M.T.** , Islam, B., Nirjon, S., Kinget, P. and Jiang, X., SEUS: A Wearable Multi-Channel Acoustic Headset Platform to Improve Pedestrian Safety: Demo Abstract. *In Proceedings of the 14th ACM Conference on Embedded Network Sensor Systems*. ACM, 2016. **Best Demo Runner Up**

Selected Projects

Gesture Recognition from WiFi

- Implemented a **Convolutional Neural Network(CNN)** and **LSTM** based neural network architecture for gesture recognition using **WiFi Channel State Information(CSI)**.

Acoustic Event Classification

- Implemented a **Siamese Network** to classify acoustic event on **ESC-50 dataset**.

Emoji Prediction for Tweet

- Implemented **RNN** and **CNN** models with **Word2Vec** as word embedding to predict emoji from a tweet **Dataset: SemEval-2018 Task 2, Multilingual Emoji Prediction**.

Adversarial Network

- Implemented a **Generative Adversarial Network(GAN)** for image generation.

Indoor Localization for LP-WAN protocol(LoRa)

- Implemented a machine learning based system**(fingerprinting)** to **localize** LoRa devices with **RSSI** value.

Happy Watch

– Worked in a team to create a portable **wireless health monitoring system**, consisting of a **smart phone application** and a **wearable embedded device**.

– Became **World Finalist and National Champion , Microsoft Imagine Cup, Russia 2013**

Research Experience

Graduate Research Assistant, University of North Carolina at Chapel Hill, August 2016–Present.

– Topic: **Zero Shot Learning for Acoustic Event Recognition**.

* Proposed a **zero shot learning** method for audio classification using **cross-modal projection** from audio to text embedding.

* Used a **Siamese network** architecture for improved audio feature representation.

– Topic: **Privacy protection from continuous audio sensing of smart and mobile devices**.

* Worked on **blind source separation**, **audio event classification** with limited training examples and machine learning for **speech recognition** in noisy environment.

* Implemented the system on an **embedded platform (BeagleboneBlack)** with **multi-channel** audio sensing.

– Topic: **Localizing car by acoustic sensing.**

* Proposed a **novel acoustic feature** to capture frequency domain characteristics of low-frequency noise-like sounds by unequally dividing the frequency scale in order to capture variation in spectral energy at the lower end of the frequency spectrum.

– Topic: **Real-Time Scheduling of Wireless Links in Low Power Wide Area network (LP-WAN).**

* Proposed a real-time **scheduling system** for low powered devices to send data within pre-defined deadlines using LP-WAN technology.

* Developed **embedded system (Arduino and Raspberry Pi)** with LP-WAN capabilities and deployed a city-wide testbed with real sensors.

Awards and Honors

World Finalist and National Champion, Microsoft Imagine Cup 2013.
RunnerUp, Code Hub, Mobile App Hackathon, 2014.

Computer Skills

• Language: C/C++, Java, Python, C#
• Analysis Tool & Framework: Tensorflow, MATLAB, Weka
• Mobile & Web: Android, PHP, Oracle, MySQL
• Scripting: LaTeX, HTML, Prolog
• Operating System: Linux, Windows, Unix