

K M Naimul Hassan

Research Statement

Current Research

I am currently working on a Brain-Computer Interface (BCI) project focused on an Audio-Video Listening Study aimed at identifying physical and neural cues associated with speech attention. This study examines how multi-modal cues—such as audio, visual stimuli, head movements, and neural activity (particularly EEG)—can be used to determine which speech signals a person is attending to and how these cues vary across different listening environments. A central goal is to create a large, comprehensive dataset for auditory attention detection (AAD). Existing AAD datasets are often limited in both size and scope, typically consisting of fewer than 1,000 minutes of data, with only two speakers in noise-free environments and non-English speech stimuli. Our project intends to significantly expand this by incorporating four speakers and English-language speech stimuli. Participants will wear a range of sensors, including EEG headsets and glasses, to focus on one of the four speech stimuli and answer related questions to assess their attentiveness. This will result in the largest AAD dataset to date, offering valuable training data to improve the accuracy of AAD systems, with promising applications for smart hearing aids.

Previous Research

My passion for research is driven by a desire to contribute to the greater good. In addition to my current project, I have been involved in several impactful projects, such as -

- [Detecting ALS from raw EMG signals](#)
- [Speech-privacy-aware cough detection](#)
- [Sound event detection in medical environments](#) (*under review*)
- [Sound source localization for search-and-rescue operations](#)

These experiences, alongside my participation in international student competitions, have equipped me with practical skills in solving real-world problems. They have not only led to meaningful publications but also enhanced my leadership, teamwork, and communication abilities, fueling my drive to tackle complex challenges.