

Postgraduate Seminar Series

Venue: Graduate Seminar Room

Date & Time: January 24, 2026 at 3:00 PM

Speaker Information

Muhammad Farhan Niaj Neebir (Std No. 1018052051) is a part time M.Engg. student in the department of CSE, BUET. He completed his undergraduate studies from BUET in 2016. His research focuses on computational modeling of human behavior. He is currently doing his postgraduate project under the supervision of Dr. A.K.M. Ashikur Rahman. He will be speaking about his ongoing project in this talk.



Survey on EEG based Lie Detection Techniques

Detecting deception is a very challenging but highly desired task in various domains such as law enforcement, judiciary, national security, and digital communication. Ancient methods relied on physiological signals measured with polygraphs, human intuition, or behavioral cues, all of which are often inaccurate and vulnerable to manipulation. Electroencephalography (EEG), which records electrical activity in the brain in real time, has become a promising technology for deception detection in recent years. We present a comprehensive review of EEG-based deception detection techniques. The literature is divided into two main approaches: the Guilty Knowledge Test (GKT), which uses fixed-response stimulus recognition tasks, and the more naturalistic Open-Ended Question (OEQ) paradigm. Techniques in GKT are further divided into statistical methods—such as Bootstrapped Amplitude Difference and Bootstrapped Correlation Difference—and machine learning-based approaches employing classifiers like Support Vector Machine (SVM), Extreme Learning Machine (ELM), and Linear Discriminant Analysis (LDA). On the other hand, OEQ-based approaches permit free speech and spontaneous responses which more closely resemble interrogation in the real world. These studies are categorized into multimodal analysis, which combines EEG with additional modalities such as video, audio, gaze, and other physiological or behavioral data, and connectivity analysis, which analyzes brain communication pattern during deception. However, these methods are challenging to implement because speech interferes with EEG signals. We analyze the results, highlighting accuracy rates, limitations, and countermeasures. This work serves as a foundational resource for researchers aiming to build or improve EEG-based deception detection systems and identifies key directions for future exploration.