

## ABSTRACT

This final project highlights a prominent issue faced by the deaf community, which is the communication barrier between the deaf and hearing individuals due to the use of sign language for communication. To address this problem, a robust solution is proposed in the form of an application that serves not only as a tool for learning SIBI sign language for hearing users but also as a sign language translator.

The proposed solution leverages various fields in Computer Engineering to create an integrated application. By implementing machine deep learning techniques like LSTM and YOLOv5, the system will recognize and interpret SIBI sign language. Additionally, the development of the Android application and the backend ensures reliable and efficient app operation, forming the critical backbone of the system.

The final product of this Capstone Design project is an application featuring deep learning LSTM for motion detection with 95.56% accuracy, YOLOv5 for real-time detection with a mAP@0.5IoU of 99.5%, LSTM for text correction with 92.5% accuracy, SIBI motion animations for learning, and Android implementation through the backend. Reliability testing of the application resulted in an r<sub>11</sub> value of 0.914428422, indicating a very high level of reliability. The server's response time in the test also ranged from 1 to 5 seconds, with an average memory usage of 130 MB.

**Keywords:** SIBI, inclusivity, Machine Learning, LSTM, YOLOv5, Android, Backend, Animation