# Computer Science GTA Project

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**Section 2 – *Project Information***

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| **Project Title** | SignTranslator: Bidirectional Translation Between Sign Language and Speech/Text Using AI | |
| **Project Highlights:** | 1. | Propose and develop a novel AI-based approach for bidirectional translation between sign language and speech/text. |
| 2. | Address a major accessibility challenge faced by Deaf and hard-of-hearing communities across diverse linguistic backgrounds. |
| 3. | Combine cutting-edge techniques in computer vision, natural language processing, and deep learning for real-world impact. |
| **Project Summary** | | |
| According to the World Health Organization, over 466 million people worldwide experience disabling hearing loss, including more than 70 million individuals who use sign language (SL) as their primary mode of communication. For many Deaf individuals, Sign Language is not just a means of communication but their native and natural language, deeply tied to their cultural identity and community. It is a fully-fledged visual language with its own grammar, syntax, and regional variations—distinct from spoken and written languages. There are over 300 different sign languages globally, creating substantial communication barriers between signers and non-signers in key areas such as education, healthcare, and employment.  This project, titled *SignTranslator*, aims to bridge the communication gap between signers and non-signers by developing a deep learning-based system for bidirectional translation between sign language and spoken/written language. The system will operate in two main modes: (1) converting spoken or written input into sign language (via animated avatars or sign videos), and (2) interpreting sign language (through video input) into speech or text. This will involve integrating computer vision techniques for gesture recognition, natural language processing for language generation.  Students will explore recent advances in pose estimation, transformer-based architectures, and multimodal learning. The project will utilize publicly available datasets of sign language videos (e.g., How2Sign, How2 with American Sign Language(ASL) transcriptions) and involve training and evaluating models on translation accuracy, fluency, and latency. Applications include public service kiosks, video conferencing tools, and educational platforms.  This project not only presents a technically challenging problem but also contributes to global accessibility efforts, supporting equity and inclusion for the Deaf and hard-of-hearing communities. | | |