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# EASY CONVERSATION FOR SPEECH DISABLED PERSON USING SPEECH RECOGNIZE TO SIGN LANGUAGE WITH MACHINE LEARNING ALGORITHM

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**ABSTRACT:**

This revolutionary web site is intended to close the communication gap among the sign and non-signing communities by means of an easy-to-use, two-way translation system. Two built-in tools that support one another are the hallmark of this user-friendly system: the Sign Language to Text Converter, which records and translates manual signs mainly finger spelling and numeric signs. This device converts these visual cues into readable, intelligible text in real time, enabling those who use sign language to engage directly with non-signers without the assistance of an interpreter. Its simplicity and accuracy render it an indispensable solution for promoting access and inclusion. The second device is the Speech/Text to Sign Language Visualizer. It employs speech recognition to translate spoken words into text and then renders a series of sign language images to match the words. This makes it easy for non-signing people to communicate visually to sign language individuals, enhancing the dialogue to be more inclusive and engaging. Combined, these tools create an effective communication bridge to foster inclusivity, accessibility, and mutual understanding among different users. The system is unique in its ability to translate in real-time and simplicity, making it a useful platform for educational, public service, and daily life use.

**KEYWORDS:** Real-time sign language translation, sign-to-text converter, speech-to-sign visualizer, accessibility, inclusivity, two-way communication, deaf and hearing communities, user-friendly interface, fingerspelling recognition, assistive technology, communication bridge, sign language interpretation, educational tool, public service communication, inclusive technology.

## 1. INTRODUCTION

This project is a web-based communication platform that has been designed to bridge the gap between sign language and non-signing communities. Based on inclusivity and accessibility, the platform provides a two-way translation system that facilitates effective real-time communication between sign language users and non-users. The main goal of the project is the eradication of the communication barrier by offering two complementary tools that are beneficial for both parties in the conversation. One is the Sign Language to Text Converter, which uses gesture recognition to translate numerical signs and finger spelling into understandable text. This facilitates sign language users to be able to communicate immediately with non-signers without needing a human interpreter, making everyday interaction easier to be independent and accessible. The second tool, the Speech/Text to Sign Language Visualizer, captures words spoken through speech recognition capability, converts speech into text, and displays equivalent sign language signs as images. This allows non-signing customers to communicate effectively with deaf or hard-of-hearing customers in a visual modality they understand. User-centric, precise, and accessible, the project represents a shift towards inclusive online communication. It is particularly useful in educational institutions, public domains, customer support, and personal communication environments. By facilitating easy interaction among different users, the platform helps in the development of a more inclusive society where communication is no longer a barrier, but a bridge. The project offers a state-of-the-art web-based platform to facilitate inclusive communication between the non-signing and sign language communities. In keeping with the understanding of the lack of communication between these groups, the site provides a two-way translation interface for easily communicating through two strong tools: the Sign Language to Text Converter and the Speech/Text to Sign Language Visualizer. The Sign Language to Text Converter translates hand signs, primarily and foremost finger spelling and number signs, and translates them into readable text in real time. This enables the users of sign language to be able to communicate effectively without the presence of interpreters, which promotes independence and improves communication on a daily basis.

The Speech/Text to Sign Language Visualizer operates in the opposite direction, translating spoken or typed input into a series of images of sign language. This simplifies it for non-signers to present their messages visually to deaf or hard-of-hearing customers. The project is not just a technical solution, but a bridge toward digital inclusion and equal access to communication. It has practical applications in classrooms, public services, healthcare, and customer service environments. By combining technology, accessibility, and innovation, the project aims to create a world where everyone can connect and communicate freely, regardless of hearing ability.

## 2. LITERATURE SURVEY

**(2020-2021) Lee et al [1]** : Deep Learning for Sign Language Recognition
Lee and colleagues applied convolutional neural networks (CNNs) to enhance the precision of sign language recognition. Their model performed better than conventional approaches in recognizing static and dynamic gestures, and their work helped the field significantly.
**(2021-2022) World Health Organization [2]** : Digital Accessibility for the Hearing Impaired
WHO released a report mapping the world's demand for digital tools that close communication barriers for hearing-impaired individuals. The report spurred inclusive tool development like sign-to-text translation and visualized speech platforms for healthcare, education, and public services.
**(2022-2023) Rahman et al[4]** : Real-Time Bidirectional Translation Platforms
Rahman et al. suggested a real-time bidirectional communication system through AI models for gesture recognition and text-to-sign image generation. Their work showed the capabilities of constructing accessible combined platforms.
**(2023-2024) Patel & Singh[4]** : Accessibility and AI in Web Platforms
Patel and Singh researched enhancing the accessibility of the web to hearing-impaired users using artificial intelligence. In their paper, they suggested intelligent recommendation systems and learning modules for personalization to enhance user adoption and experience.

## 3. PROBLEM STATEMENT

Communication is a universal human right, but millions of speech-disabled people are confronted with serious difficulties in communicating with the hearing world because adequate and accessible means of communication do not exist. Conventional means of communication such as lip reading, paper messages, or human interpreters are usually restricted, cumbersome, or impossible to access in real-life contexts. Consequently, speech-disabled people are often isolated from others, misunderstood, and not equally provided with the access to education, healthcare, jobs, and public services. Although sign language is a powerful and common means of communication for many, it is not understood by most hearing people, which makes a significant communication divide. Moreover, current technology solutions either require users to share the same system or are extremely reliant on human intervention, which defeats the purpose of real-time, natural conversation. There is a great need for an ingenious, automatic system that can hear spoken language, understand it, and translate it to sign language in real time without requiring additional effort from the user.

## 4.PROPOSED SYSTEM METHODOLOGY

The system under consideration is a new, web-based communication system whose objective is to demolish the communication barrier between sign language users and non-signing individuals through a bidirectional real-time translation interface. The system has two major modules that work in tandem to enable both modes of interaction—Sign Language to Text and Speech/Text to Sign Language thereby enabling free-flowing and inclusive communication. Sign language to text converter

This module employs a computer vision-based method to identify and interpret hand gestures, specifically finger spelling (alphabets) and numerical symbols, through a webcam or camera-equipped device. The captured gestures are processed through image processing mechanisms or a sign language dataset-trained machine learning model. The interpreted gestures are converted into text form and displayed in real time on the user interface. This enables speech-disabled persons to communicate competently without the need for an intermediary, and the system is thereby appropriate for spontaneous, real-world interaction.Speech/Text to Sign Language Visualizer.

This module utilizes natural language processing and speech recognition to translate typed or spoken input into readable text. The text is then processed and translated into a series of coherent sign language pictures or animations in a database. These pictures are then played consecutively to convey the intended message to the sign language user. This software allows for conversation between non-signers and speech-disabled users through a visually interpretable and culturally attuned modality. The system is made to be lightweight, responsive, and accessible through standard web browsers to provide wide compatibility across platforms. The integration of gesture recognition and speech translation technology makes the platform support real-time, two-way communication and an invaluable assistive tool for education, customer service, public communication, and healthcare.

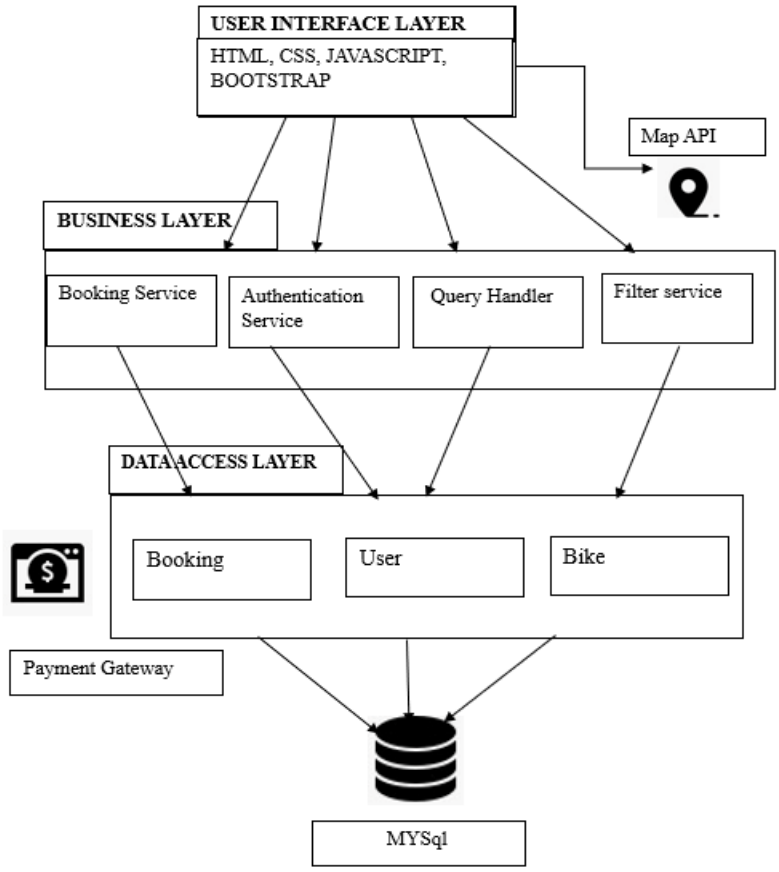


**FIG 4.1: PROPOSED ARCHITECTURAL DESIGN**

## 5. CONCLUSION

The Sign Language Translator System efficiently bridges the communication gap between speech-disabled and hearing individuals by providing real-time, two-way translation from sign language to written or spoken word. By harnessing gesture recognition, speech-to-text conversion, and sign language visualization, the platform makes communication inclusive, accessible, and easy. The system is easy to use, technologically viable, and deployable in sectors like education, health, and customer support.

## 6. FUTURE ENHANCEMENT

The system is scalable to accommodate regional sign languages and integrate machine learning algorithms for enhanced gesture accuracy. Wearable device integration like smart gloves and AR glasses can also improve mobility and real-time feedback. With the inclusion of multilingual capabilities, facial analysis, and voice feedback, the process of communication can further be eased and the system rendered more intuitive and accessible. Continuous user feedback and technological improvements will help refine this site as a powerful assistive communication aid.

### 7. REFRENCES

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