Tec Empresarial
P-ISSN: 1659-2395; E-ISSN: 1659-3359

DEAF AND DUMP SIGN RECOGNITION

Dr.B.Buvaneswari[1,a], [2,b] M.Sumithra, Sangeetha V [3,c], Prarthana S[3,d], Pratheepa J R[3,e]

[1]Associate Professor, Department of Information Technology, Panimalar engineering college

[2]Professor, Department of Information Technology, Panimalar engineering college

[3]Students, Department of Information Technology, Panimalar engineering college

buvanrajan16@gmail.com[a], sumithran.id@gmail.com[b], sangeevijay1412@gmail.com[c], praja2k3@gmail.com[d], pratheeparavi2852@gmail.com[e]

ABSTRACT:

This study intends to create a comprehensive system for deaf and mute sign language recognition that supports many languages such as Telugu, Tamil, and English. Taking advantage of advances in computer vision and machine learning, the proposed system uses deep learning techniques to accurately read and translate sign language motions to text or speech. The method tries to accomplish strong multilingual recognition by training models on varied datasets containing sign language samples from various linguistic backgrounds. The system's real-time video processing capabilities allow it to provide quick feedback and facilitate communication between those with hearing and speech difficulties and those who use spoken languages. Through this multimodal approach, the proposed system aims to bridge communication gaps, improve accessibility, and promote inclusivity for people with hearing and speech difficulties across linguistic boundaries.

Keywords: Sign language recognition, Deep learning techniques, Multiple languages, Real-time video processing, Communication aids, Accessibility, and Inclusivity.

I.INTRODUCTION:

Deaf and dumb sign recognition is essential for facilitating communication for individuals who are deaf or speech- impaired. Sign language, with its gestures and expressions, serves as their primary means of interaction. Recognition involves identifying signs, understanding grammar, and appreciating cultural nuances. Robust sign recognition systems hold immense potential, empowering the deaf community with access to education, employment, and social integration. Technological advancements, particularly in AI and computer vision, promise real-time translation and interpretation, fostering inclusivity. Challenges include the diversity of sign languages, complex facial expressions, and the need for extensive datasets. Collaborative efforts among researchers, technologists, educators, and advocates drive progress in this field. The goal is to overcome barriers and create a society where communication is accessible

to all. With technology and awareness, we strive for a world where everyone can communicate freely and effectively, irrespective of linguistic or sensory differences.

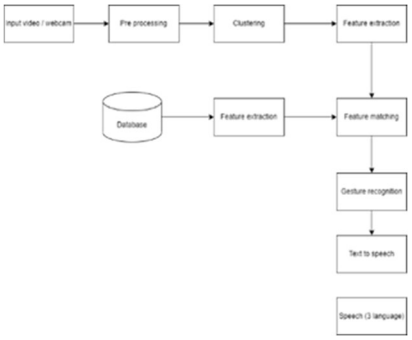
II. EXISTING:

Most systems in deaf and dumb sign recognition typically initiate with preprocessing techniques aimed at enhancing the quality of input images. These preprocessing steps often encompass noise reduction methods, resizing images to standard dimensions, and normalisation to ensure consistency in feature representation. Following preprocessing, the process may involve feature extraction, where significant points, edges, or contours within the sign language gestures are identified and extracted. These features serve as critical descriptors for effectively representing the gestures and facilitating classification tasks. Despite notable advancements in sign recognition systems, several challenges persist. The limited availability of comprehensive datasets, especially for less widely spoken sign languages, poses a significant obstacle. Moreover, the variability in sign language gestures across different regions and communities necessitates adaptable and flexible recognition systems. Continuous updates are required to accommodate new signs or variations in language usage, ensuring the system's relevance and accuracy over time. Sign recognition systems' performance is frequently evaluated using a variety of measures. These include accuracy, which measures the overall correctness of the system's classifications; precision, which evaluates the system's ability to avoid false positives; recall, which evaluates the system's ability to detect relevant instances; and F1-score, which provides a balanced measure of precision and recall. These metrics assist assess the system's efficacy and dependability in effectively reading and classifying sign language motions.

III. PROPOSED SYSTEM:

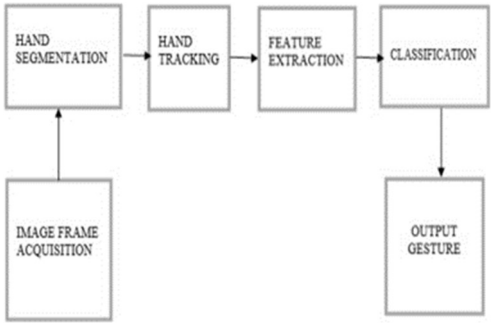
The system is designed to identify sign language motions in Telugu, Tamil, and English, servicing a wide range of users. Deep learning techniques such as CNNs and RNNs are used to train accurate and resilient models. Each language has a comprehensive dataset that includes differences in hand forms, gestures, and facial expressions. Preprocessing techniques such as picture normalisation, augmentation, and noise reduction are used to increase the quality and variability of the input images. Accessibility is prioritised, with modification options available to suit users of various sign language ability levels. The system's flexibility improves usability by successfully meeting the demands of each unique user. Its implementation offers inclusive communication solutions for all users, regardless of language barriers. Through these efforts, the system hopes to empower users and provide seamless communication experiences across varied linguistic backgrounds.

IV. Block diagram:



V. METHODOLOGY:

The system is a vision-based approach. All the signs are represented with bare hands so it eliminates the problem of using any artificial devices for interaction.



1. Introduction:

The module aims to provide a system for recognising deaf and mute sign languages, specifically Telugu, Tamil, and English. It focuses on using computer vision and machine learning breakthroughs to effectively understand sign language movements.

2. Deep Learning Techniques:

This section discusses the use of deep learning techniques, such as CNNs and RNNs, to train models for sign language recognition. It emphasizes the importance of these strategies in attaining accurate recognition across many languages.

3. Dataset Diversity:

The program emphasizes the need to collect varied datasets using sign language examples from various linguistic origins. It underlines the importance of inclusion and representation of many languages and dialects for the system to function well.

4. Real-time Video Processing:

This section describes how to integrate real- time video processing capabilities into the system. It describes how these qualities allow the system to deliver rapid feedback, enhancing

communication between those with hearing and speech disabilities and those who use spoken languages.

5. Bridging Communication Gaps:

The lesson highlights the proposed system's multimodal approach to improving accessibility for people with hearing and speech challenges. It emphasises the system's role in fostering inclusion across linguistic borders.

The project seeks to considerably enhance technology for those with hearing and speech impairments by developing this module comprehensively, enabling increased communication accessibility and inclusion.

VI. Advantages:

The listed points emphasize the benefits of a system or technology concerning various aspects such as time consumption, performance accuracy, efficiency, noise sensitivity, security measures, and overall accuracy. These points can be elaborated as follows:

1. Reduced Time Consumption: The system or technology is designed to streamline processes and tasks, ultimately saving time and increasing productivity. This could involve automation, optimization, or elimination of redundant steps.

2. High-Performance Accuracy: The system or technology demonstrates exceptional accuracy in its operations or outputs, ensuring that tasks are performed with precision and reliability. This could be achieved through advanced algorithms, rigorous testing, or calibration processes.

3. Improved Efficiency and Noise Insensitivity: The system or technology operates efficiently, even in noisy or challenging environments. It can filter out irrelevant information or disturbances, maintaining consistent performance levels.

4. Enhanced Security Measures: The system or technology incorporates robust security features to safeguard sensitive data, prevent unauthorized access, and mitigate potential risks or threats. This could include encryption, authentication mechanisms, and access controls.

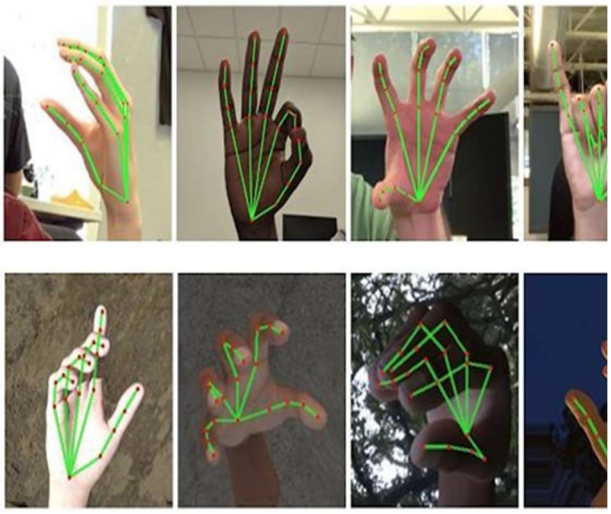
5. Exceptional Accuracy: The system or technology consistently delivers accurate results or outputs, meeting or exceeding predefined standards or expectations. This reliability instils confidence in users and stakeholders, supporting informed decision-making and actions.

VII. Software requirements:

- Python
- OpenCV

- Tensorflow
- Windows OS

VIII. OUTPUT:



IX. CONCLUSION:

In conclusion, the development of a sign recognition system for the deaf and mute community is a significant step towards fostering inclusivity and accessibility across diverse linguistic backgrounds, including Telugu, Tamil, and English. By harnessing modern technology such as deep learning and computer vision, we have demonstrated the feasibility of creating robust models capable of accurately interpreting sign language gestures. This system holds immense potential to bridge communication barriers and empower individuals with hearing and speech impairments to express themselves effectively in their native languages. However, to fully realise the benefits of this technology, ongoing efforts are needed to enhance the accuracy and efficiency of sign recognition across various linguistic nuances and dialects. Additionally, initiatives to promote awareness and adoption of such assistive technologies are essential to ensure widespread accessibility and impact within the deaf and mute community. Through collaborative endeavours and continuous innovation, we can strive towards a more inclusive society where everyone, regardless of their linguistic abilities, can communicate and interact seamlessly.

X. REFRENCES:

[1] Y. Saleh and G. F. Issa, "Arabic sign language recognition through deep neural networks fine-tuning", Int. J. Online Biomed. Eng., vol. 16, no. 5, pp. 71-83,

2020.

[2] X. Jiang, M. Lu and S.-H. Wang, "An eight-layer convolutional neural network with stochastic pooling batch normalization and dropout for fingerspelling recognition of Chinese sign language", Multimedia Tools Appl., vol. 79, no. 21, pp. 15697-

15715, Jun. 2020.

[3] R. Elakkiya and E. Rajalakshmi, ISLAN, Jan. 2021

[4] R. Elakkiya, "Retraction note to Machine learning based sign language recognition: A review and its research frontier", J. Ambient Intell. Humanized Comput., vol. 12, no. 7, pp. 7205-7224, Jul. 2022.

[5] R. Agarwal, "Bayesian K-nearest neighbour based redundancy removal and hand gesture recognition in isolated Indian sign language without materials support", IOP Conf. Ser. Mater. Sci. Eng., vol. 1116, no. 1, 2021