LITERATURE SURVEY

[1] ML Based Sign Language Recognition System

This document provides an overview of the various stages involved in the creation of an automated sign language recognition (SLR) system. Building a system capable of comprehending and interpreting sign language necessitates extensive training on a substantial dataset and the utilization of optimal algorithms. In this initial SLR system, we have designed an isolated recognition model. This model relies on the detection and recognition of isolated hand gestures through a vision-based approach. To evaluate the performance of the ML-based SLR model, we conducted assessments with four participants within a controlled setting. For feature extraction, the model employed a convex hull, and for classification, it utilized the K-Nearest Neighbours (KNN) algorithm. The outcome of this model demonstrated an accuracy of 65%.

[2] Deep learning-based sign language recognition system for static signs.

This paper addresses the robust modelling of static signs within the domain of sign language recognition, utilizing deep learning through convolutional neural networks (CNNs). The study involved the collection of a total of 35,000 sign images, encompassing 100 distinct static signs contributed by various users. The effectiveness of the proposed system was assessed across approximately 50 different CNN models. Additionally, the results were subjected to evaluation based on a range of optimizers. Notably, the proposed approach exhibited remarkable achievements with the highest training accuracy of 99.72% for colored images and 99.90% for grayscale images. Furthermore, the system's performance was gauged using precision, recall, and F-score metrics. It's worth mentioning that this system outperformed prior works that primarily focused on recognizing only a limited set of hand signs.

[3] Max-pooling convolutional neural networks for vision-based hand gesture recognition

This system explores the application of computer vision for gesture recognition in the context of human-robot interaction. The study focuses on developing a real-time hand gesture interface for mobile robots. It employs a deep neural network called MPCNN for supervised feature learning and gesture classification. Colored gloves and image processing techniques are used to enhance recognition accuracy. The MPCNN system achieves an impressive 96% accuracy in classifying six distinct gesture classes, outperforming competitors. Practical experiments confirm real-time gesture recognition capabilities in mobile robots, showing promise for seamless human-robot interactions.

[4] Sign Language Recognition System Using Deep Neural Network

In this research paper a two-layer Convolutional Neural Network (CNN) is used to classify sign language image datasets. The classifier performs well under varying lighting and noisy conditions, achieving remarkable accuracy rates of 99.12% with SGD and 99.51% with Adam optimizer. The paper suggests future work involving hyperparameter tuning and expanding the system to recognize sign language from video sequences using CNN LSTM, with potential applications in device control, including home robots. Model is trained with the optimization based on the gradient descent method. Classification is carried using SGD optimizer for model 1(M1) and Adam optimizer for model 2(M2) are used for optimizing, where the cost function used is Categorical Cross entropy.

[5] Sign language translation

This paper employs computer vision for real-time sign language recognition, enhancing communication with hearing-impaired individuals. The system comprises four modules: image capturing, preprocessing, classification, and prediction. Using Python's OpenCV, sign gestures are captured and processed, achieving a remarkable 99.91% accuracy in translation to text. The system optimizes memory usage by storing pixel values in a CSV file. This survey sheds light on the development of a real-time sign language recognition system, potentially improving interactions between the hearing-impaired and the broader community.

[6] Static Sign Language Recognition Using Deep Learning

The system employs a skin-color modeling technique, specifically explicit skin-color space thresholding, to distinguish between hand and background elements by predefining a skin-color range. Images are then processed through a Convolutional Neural Network (CNN) for classification, with training conducted using Keras. Under favorable conditions of adequate lighting and a uniform background, the system demonstrates an impressive average testing accuracy of 93.67%. Notably, the accuracy breakdown reveals 90.04% for American Sign Language (ASL) alphabet recognition, 93.44% for number recognition, and 97.52% for static word recognition. These results surpass those reported in comparable studies. It highlights the promising contributions of a skin-color-based sign language learning system, showcasing its potential for facilitating sign language education for beginners.

[7] Bidirectional Sign Language Translation

This research project introduces a portable and readily accessible system that supports bidirectional translation, enabling the conversion between sign language and spoken language as well as from spoken language to sign language. Portability is guaranteed through the utilization of a smartphone application, eliminating the need for extra hardware. Additionally, the system employs Machine Learning and a pre-trained model created through a fusion of Convolution and Recurrent Neural Networks. As a result, this solution has the capability to assist both the hearing-impaired and speech-impaired communities, enabling their active participation in social gatherings. The primary innovation presented in this work is the adoption of video sequences to convey word and phrase information, as opposed to the conventional letter-by-letter spelling method.

[8] Real-time Sign Language Recognition using Computer Vision

This paper aims to bridge the gap between differently-abled individuals, such as those who are deaf and mute, and the rest of society. It accomplishes this by employing a real-time system that combines image processing with machine learning. Image processing is utilized to preprocess the images, removing the background and isolating the hands. These processed images are then used to create a dataset containing all 24 alphabets of the English language. The Convolutional Neural Network (CNN) proposed in this study is evaluated using both a custom dataset and real-time hand gestures performed by individuals with varying skin tones. The results indicate that the proposed algorithm achieves an accuracy of 83%.

[9] Machine Learning-based Hand Sign Recognition

This system employs a variety of classifiers for hand detection, utilizes skin segmentation for recognizing gestures, and incorporates an empirical tracking method that can adapt dynamically based on the stage of the action. It offers a seamless means of interaction without the necessity of sensors or external devices. The primary objective is to enhance Human-Computer Interaction (HCI) by enabling human-to-human interaction in close proximity through the development of a sign language recognition system. This system aids in predicting the contextual dialogue between individuals, facilitated by an intermediary. Additionally, this system offers a feature for learning sign language through speech recognition, catering to individuals who aspire to acquire proficiency in the language.

[10] Research of a Sign Language Translation System Based on Deep Learning

This paper illustrates hand locating and sign language recognition of common sign language on basis of neural network by focusing on Faster R-CNN which aims to recognize sign language video or part of the hand in the picture. A 3D Convolutional Neural Network (CNN) is employed for feature extraction, complemented by a sign language recognition framework built on Long Short-Term Memory (LSTM) coding and decoding networks for sequences of sign language images. This framework enhances recognition accuracy by capturing the context of sign language expressions. To address the challenge of practical RGB sign language image and video recognition, this study integrates a hand localization network, a 3D CNN feature extraction network, and LSTM encoding and decoding techniques to establish an effective recognition algorithm.