

Real-Time Communication System Powered by AI for Specially Abled

Introduction

In our society, we have people with disabilities. Although technology is constantly evolving, little is being done to improve the lives of these people. It has always been difficult to communicate with someone who is deaf-mute. It is quite challenging for silent persons to communicate with non-mute people. because hand sign language is not taught to the general public. It might be quite challenging for them to communicate at times of crisis. In circumstances where other modes of communication, like speech, are not possible, the human hand has remained a common alternative for information transmission. To have a proper communication between a normal person and a handicapped person in any language, a voice conversion system with hand gesture recognition and translation will be very helpful.

Literature survey

Here, we will take a look at all the previous solutions, attempts and implementations to the gesture recognition application or anything that is atleast vaguely related to it.

Existing solutions

The convolution neural network is used to create a model that is trained on different hand gestures. An app is built which uses this model. This app enables deaf and dumb people to convey their information using signs which get converted to human-understandable language and speech is given as output.

S.NO	PAPER TITLE	AUTHOR(S)	MONTH/YEAR	METHOD/IMPLEMENTATION TECHNIQUE(S)	REFERENCE
1.	A Comprehensive Study on Deep Learning-based Methods for Sign Language Recognition	Nikolas Adaloglou, Theocharis Chatzis, Ilias Papastratis, Andreas Stergioulas	Mar,2021	1.Continuous sign language recognition 2.2D and 3D CNN-based CSLR approaches 3.Evaluating the GSL datasets 4.Implementing the SLR approaches 5.Sequence learning training criteria for CSLR 6.Experimental evaluation	Adaloglou, Nikolas, et al. "A comprehensive study on deep learning-based methods for sign language recognition." IEEE Transactions on Multimedia 24 (2021): 1750-1762.
2.	INCLUDE: A Large Scale Dataset for Indian Sign Language Recognition	Advait Sridhar, Rohith Gandhi Ganesan, Pratyush Kumar, Mitesh Khapra	Oct,2020	1.Datasets on sign language 2.Sign language recognition methods 3.The INCLUDE dataset 4.Methods for SLR on include <ul style="list-style-type: none"> • Augmentation • Feature extraction • Deep learning pipelines 5.Experimental evaluation	Sridhar, Advait, et al. "Include: A large scale dataset for indian sign language recognition." Proceedings of the 28th ACM international conference on multimedia. 2020.
3.	Sign Language Transformers: Joint End-to-end Sign Language Recognition and Translation	Necati Cihan Camgoz , Oscar Koller, Simon Hadfield and Richard Bowden	Mar,2020	The goal of sign language translation is to either convert written language into a video of sign (production) or to extract an equivalent spoken language sentence from a video of someone performing continuous sign. However, in the field of computer vision, much of this latter work has focused on recognising the sequence of sign glosses (Continuous Sign Language Recognition (CSLR)) rather than the full translation to a spoken language equivalent (Sign Language Translation (SLT)).	Camgoz, Necati Cihan, et al. "Sign language transformers: Joint end-to-end sign language recognition and translation." Proceedings of the IEEE/CVF conference on computer vision and pattern recognition. 2020.

4.	Dynamic Sign Language Recognition Based on Video Sequence With BLSTM-3D Residual Networks	Yanqiu liao , Pengwen xiong , Weidong min,and jiahao lu	Mar,2019	<p>1.Method based on hand shapes and motion trajectory</p> <p>2.Method based on video sequence</p> <p>3.Mathod overview</p> <p>4.Dynamic sign language recognition with B3D RESNET</p> <ul style="list-style-type: none"> Object location using faster R-CNN Our method-B3D RESNET model Spatiotemporal feature extraction of B3D RESNET model Learn spatiotemporal sequence feature of B3D RESNET model <p>5.Experimental evaluation</p>	Liao, Yanqiu, et al. "Dynamic sign language recognition based on video sequence with BLSTM-3D residual networks." <i>IEEE Access</i> 7 (2019): 38044-38054.
5.	Iterative Alignment Network for Continuous Sign Language Recognition	Junfu Pu Wengang Zhou Houqiang Li	June,2019	<p>This paper aims for the follow:</p> <p>1. A unified deep learning architecture integrating encoder decoder network and connectionist temporal classification (CTC) for continuous sign language recognition.</p> <p>2. A soft dynamic time warping (soft-DTW) alignment constraint between the LSTM and CTC decoders, which indicates the temporal segmentation in sign videos.</p> <p>3. Iterative optimization strategy to train feature extractor and encoder-decoder network alternately with alignment proposals by warping path.</p>	Pu, Junfu, Wengang Zhou, and Houqiang Li. "Iterative alignment network for continuous sign language recognition." <i>Proceedings of the IEEE/CVF conference on computer vision and pattern recognition</i> . 2019.
6	Deep Learning for Sign Language Recognition: Current Techniques, Benchmarks, and Open Issues	Muhammad Al-Qurishi , Thariq Khalid, and Riad Souissi	Sep,2021	<p>1.Comprehensive review and taxonomy of automated sign language recognition (ASLR) literature.</p> <p>2. Establishment of a general framework for creating SLR models</p> <p>3.Benchmark datasets and performance: An analysis of the benchmark datasets and performance used in the literature is conducted. The quality of available sign language datasets is essential for ensuring that SLR tools built and tested with them return relevant predictions.</p> <p>4.Identifying open Issues and challenges: After analyzing and discussing the existing methodologies, we draw some conclusions with respect to their limitations, open issues, and potential challenges.</p> <p>5.Experimental evaluation</p>	Al-Qurishi, Muhammad, Thariq Khalid, and Riad Souissi. "Deep learning for sign language recognition: Current techniques, benchmarks, and open issues." <i>IEEE Access</i> (2021).