LITERATURE SURVEY

TITLE : Portal Communication Aid for Specially Challenged:
Conversion of Hand Gestures into Voice and vice versa
AUTHOR : T.Meera devi, K.M.Sharavana Raju
YEAR : 2020

Communications between a normal person and with the person having hearing loss and dumb have constantly been a tough assignment. The work is to develop a portable device for the disabled people those who are not able to communicate with the normal persons properly. The technology development presents a solution to build up a sign language conversion system to support the individual with hearing loss and mute people. The core idea is to build up a real time embedded product for the disabled persons without handheld gloves to assist their announcement in efficient way. Similarly the speech communication by normal persons will be converted into gestures for the disabled persons for their better understanding. This device will act as a two way communication device between normal and disabled persons.

TITLE : Image Processing based on Deep Neural Networks for Detecting Quality Problems in Paper Bag Production

AUTHOR : Anna Syberfeldt and Fredric Vuolutera

YEAR : 2021

The use of deep neural networks to perform automatic quality inspections based on image processing to eliminate the current manual inspection. Manufacturers must identify quality issues in production and prevent defective products from being delivered to customers.They investigate deep neural network was implemented in a real-world industrial case study, and its ability to detect quality problems was evaluated through the use of deep neural networks to perform automatic quality inspections based on image processing to eliminate the current manual inspection and analysis. Their results show that the network has an accuracy of 94.5%, which is considered good in comparison to the 70–80% accuracy of a deep neural network implemented in a real-world industrial case study, and its ability to detect quality problems was evaluated, and trained human inspector to analyzed. Future work could focus on improving the solution so that it can assess not only the geometry of bags but also faults in print, coloring, and other purely aesthetic defects that are important to customers even though such flaws do not affect the function of the bag. The personnel at the company did indicate that issues with print and color are somewhat predictable, often happening when refilling printing materials or switching between product variants.

TITLE : Real time Indian sign language recognition system

AUTHOR :Najla Musthafa and C.G. Raji

YEAR : 2022

Hand gestures are one of the nonverbal communication modalities used in sign language. It is most often used by deaf and/or dumb individuals who have hearing or speech impairments to communicate with other deaf and/or dumb people or with normal people. Many manufacturers across the world have created various sign language systems; however they are neither adaptable nor cost- effective for end users. To address this, a model has been developed that provides a system prototype that can detect sign language automatically, allowing deaf and dumb individuals to transfer the message more successfully with normal people. The static visuals were processed with a convolutional neural network and the feature extraction approach, and each sign was trained with ten samples. Image processing methods are used to determine the fingertip location of static pictures and convert them to text. The suggested technique can recognize the signer's pictures that are taken in real time during the testing phase. The results demonstrate that the suggested Sign Language Recognition System is capable of accurately recognizing pictures.

TITLE : Recognition of Hand Gestures and Conversion of Voice for Betterment of Deaf and Mute People

AUTHOR :Shubham Kr. Mishra, Sheona Sinha, Sourabh Sinha, Saurabh Bilgaiyan

YEAR : 2019

Around 5% of people across the globe have difficulty in speaking or are unable to speak. So, to overcome this difficulty, sign language came into the picture. It is a method of non-verbal communication which is usually used by deaf and mute people. Another problem that arises with sign language is that people without hearing or speaking problems do not learn this language. This problem is severe as it creates a barrier between them. To resolve this issue, this paper makes use of computer vision and machine learning along with Convolutional Neural Network. The objective of this paper is to facilitate communication among deaf and mute and other people. For achieving this objective, a system is built to convert hand gestures to voice with gesture understanding and motion capture. This system will be helpful for deaf and mute people as it will increase their communication with other people.

TITLE : Artificial Intelligence Technologies for Sign Language

AUTHOR :Ilias Papastratis, Chatzikontantinou Christos,Dimitrios Konstantinidis, Kosmas Dimitropoulos

YEAR : 2021

AI technologies can play an important role in breaking down the communication barriers of deaf or hearing-impaired people with other communities, contributing significantly to their social inclusion. Recent advances in both sensing technologies and AI algorithms have paved the way for the development of various applications aiming at fulfilling the needs of deaf and hearing-impaired communities. To this end, this survey aims to provide a comprehensive review of state-of-the-art methods in sign language capturing, recognition, translation and representation, pinpointing their advantages and limitations. In addition, the survey presents a number of applications, while it discusses the main challenges in the field of sign language technologies. Future research direction are also proposed in order to assist prospective researchers towards further advancing the field

TITLE : Hand sign language recognition using multi-view hand skeleton

AUTHOR :Razieh Rastgoo, Kourosh Kiani, Sergio Escalera

YEAR : 2020

Hand sign language recognition from video is a challenging research area in computer vision, which performance is affected by hand occlusion, fast hand movement, illumination changes, or background complexity, just to mention a few. In recent years, deep learning approaches have achieved state-of-the-art results in the field, though previous challenges are not completely solved. In this work, we propose a novel deep learning-based pipeline architecture for efficient automatic hand sign language recognition using Single Shot Detector (SSD), 2D Convolutional Neural Network (2DCNN), 3D Convolutional Neural Network (3DCNN), and Long Short-Term Memory (LSTM) from RGB input videos. We use a CNN-based model which estimates the 3D hand keypoints from 2D input frames. After that, we connect these estimated keypoints to build the hand skeleton by using midpoint algorithm. In order to obtain a more discriminative representation of hands, we project 3D hand skeleton into three views surface images. We further employ the heatmap image of detected keypoints as input for refinement in a stacked fashion. We apply 3DCNNs on the stacked features of hand, including pixel level, multi-view hand skeleton, and heatmap features, to extract discriminant local

spatio-temporal features from these stacked inputs. The outputs of the 3DCNNs are fused and fed to a LSTM to model long-term dynamics of hand sign gestures. Analyzing 2DCNN vs. 3DCNN using different number of stacked inputs into the network, we demonstrate that 3DCNN better capture spatio-temporal dynamics of hands. To the best of our knowledge, this is the first time that this multi-modal and multi-view set of hand skeleton features are applied for hand sign language recognition. Furthermore, we present a new large-scale hand sign language dataset, namely RKS-PERSIANSIGN, including 10’000 RGB videos of 100 Persian sign words. Evaluation results of the proposed model on three datasets, NYU, First-Person, and RKS-PERSIANSIGN, indicate that our model outperforms state-of-the-art models in hand sign language recognition, hand pose estimation, and hand action recognition.

TITLE : A Review on Sign Language Recognition Systems

AUTHOR :Rajiv Ranjan, B Shivalal Patro, Mohammad Daim Khan, Chandan Behera

YEAR : 2021

American Sign Language (ASL) alphabet recognition using marker-less vision sensors is a challenging task due to the complexity of ASL alphabet signs, self-occlusion of the hand, and limited resolution of the sensors. This paper describes a new method for ASL alphabet recognition using a low-cost depth camera, which is Microsoft's Kinect. A segmented hand configuration is first obtained by using a depth contrast feature based per-pixel classification algorithm. Then, a hierarchical mode-seeking method is developed and implemented to localize hand joint positions under kinematic constraints. Finally, a Random Forest (RF) classifier is built to recognize ASL signs using the joint angles. To validate the performance of this method, we used a publicly available dataset from Surrey University. The results have shown that our method can achieve above 90% accuracy in recognizing 24 static ASL alphabet signs, which is significantly higher in comparison to the previous benchmarks.

TITLE : Static Sign Language Recognition Using Deep Learning

AUTHOR :Lean Karlo Tolentino, Ronnie Serfa Juan, August Thio-ac, Maria Abigail B. Pamahoy

YEAR : 2019

A system was developed that will serve as a learning tool for starters in sign language that involves hand detection. This system is based on a skin-color modeling technique, i.e., explicit skin-color space thresholding. The skin-color range is predetermined that will extract pixels (hand) from non-pixels (background). The images were fed into the model called the Convolutional Neural Network (CNN) for classification of images. Keras was used for training of images. Provided with proper lighting condition and a uniform background, the system acquired an average testing accuracy of 93.67%, of which 90.04% was attributed to ASL alphabet recognition, 93.44% for number recognition and 97.52% for static word recognition, thus surpassing that of other related studies. The approach is used for fast computation and is done in real time.

TITLE : Sign To Text Conversion- Helping Aid

AUTHOR :Vatsal Patel, Maahi Patel

YEAR : 2021

The ancient way of sign language is most natural forms of communication. The recognition of sign is place a key role in research field. The development and improvement on this kind of work need more and more new techniques to analyze the accurate results. Many people don't know it and interpreters are hard to come by, we developed a real-time technique for finger spelling-based American Sign Language using neural networks. In our technique, the hand is first sent through a filter, and then it is passed through a classifier, which analyses the class of hand movements. For each alphabet the proposed model has a 96 percent accuracy rate. This model mainly implemented for Dumb and Deaf people for communication.

TITLE : Indian sign Language Gesture Recognition
AUTHOR : Neha Baranwal, Kumud Tripathi and G.C.Nandi
YEAR : 2018

Today sign language is a vibrant field of research because it helps us to establish communication between hearing impaired community and normal community. In this paper, we proposed a novel continuous Indian Sign Language (ISL) gesture recognition technique where possibility theory (PT) has been applied. Preprocessing and extraction of overlapping frames are the major issues which is being covered in this paper using background modeling and noble gradient method. These isolated gestures are further processed and classified. Experiments are performed on 10 sentences of continuous ISL having 1000 samples. From analysis of results we found that our proposed approach gives 92% classification results on continuous ISL. A classified isolated ISL gestures are combined for generating a judgment of conviction in the form of text or words.