

Information Slide

Project PPT

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Hand Gesture Recognition and Voice Conversion for Deaf and Dumb

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Outline

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Abstract

- To communicate with individuals who are primarily deaf and dumb, sign language is a language that uses hand gestures and movements. In order to process the image and anticipate the hand gestures, this paper suggests a system that uses a Convolution Neural Network (CNN), a Deep Learning algorithm.
- This study demonstrates how 26 alphabets and 0–9 digit hand movements in Sign Language can be recognized in sign language.
- The suggested system includes modules for feature extraction and preprocessing, model training and testing, and sign to text conversion.
- To improve recognition accuracy, various CNN architectures and pre-processing methods like skin masking, greyscale, thresholding, and Canny edge detection were developed and tried on our dataset.

Introduction

- It is very difficult to communicate with individuals who are deaf and mute.
- These physically handicapped individuals are neglected by society and kept apart.
- The simplest and most natural form of communication for individuals who are hard of hearing is sign language.
- Understanding sign language is necessary to bridge the communication gap between hearing-impaired persons and the general public.



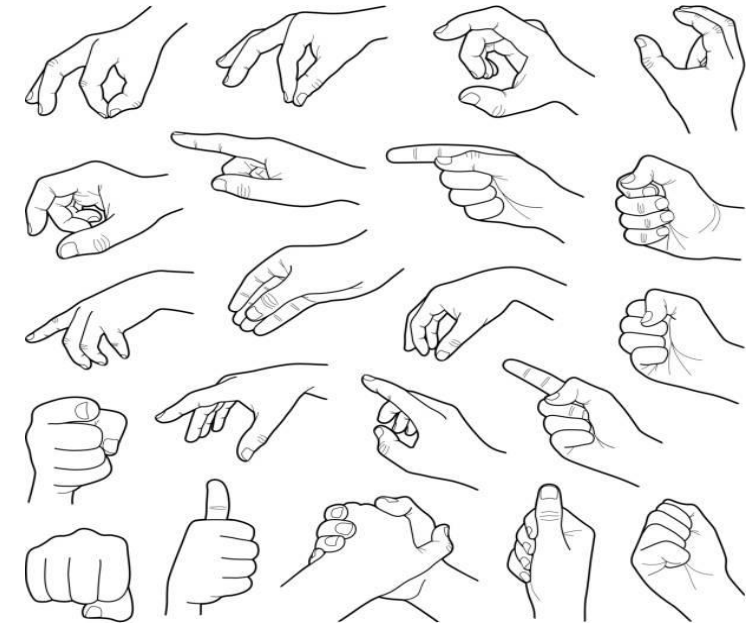
Motivation

- This project's main motivation is to improve communication with every one.
- The sign language helps to communicate with the rest of the people and provides equal rights as anyone else.
- The motivation of gesture recognition researchers is to create a system that can recognize the gestures, which are frequently used to communicate information.
- After all, everyone has a freedom to express their opinions.



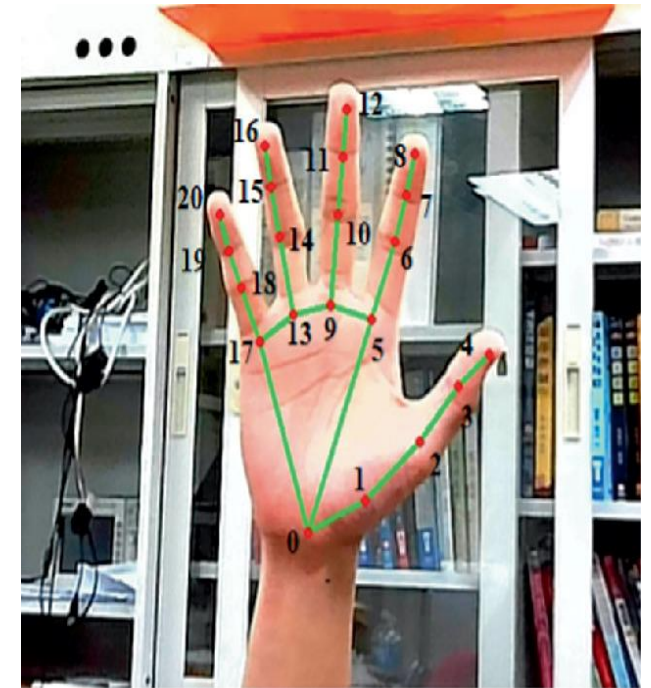
Objective

- The objective of this project is to create a system that can translate hand motions into text.
- The goal of the project is to turn pictures into text and insert them into a dataset using database matching.
- static hand gesture recognition is to classify the given hand gesture data represented by some features into some predefined finite number of gesture classes.
- Hands are seen moving as part of the detection procedure.

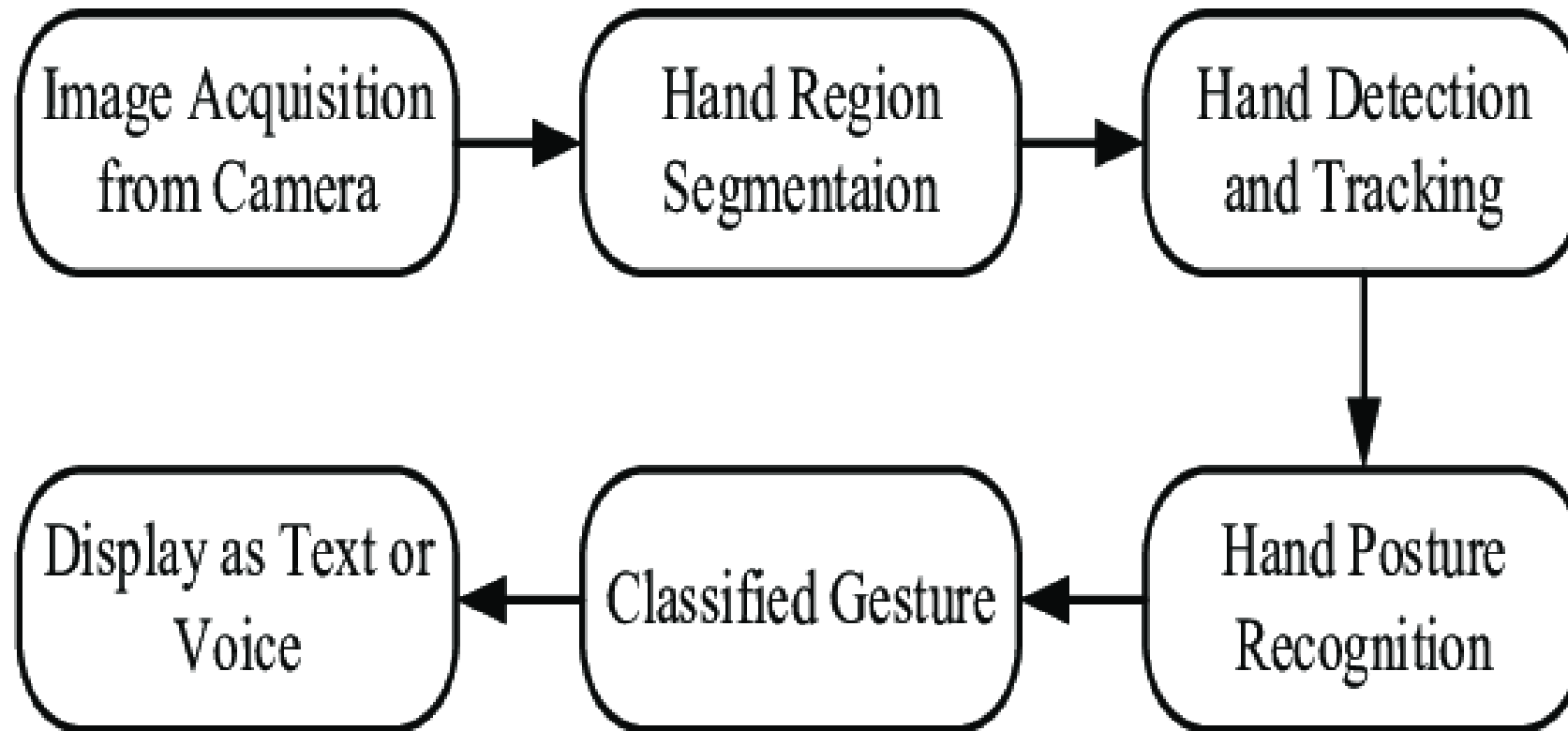


Proposed Method

- For training and testing reasons, the Convolution Neural Network model was fed the images.
- To find the best CNN architecture for the recognition of hand gestures, several CNN architectures were done and evaluated on our dataset.
- Four major steps are carried out by the process as follows:
 1. Pre-processing the image
 2. Feeding the image into the CNN model
 3. Displaying the predicted text for the image passed



Block diagram



Explanation of Proposed Work

IMPLEMENTATION

- The input is first acquired as an image or video clip that is captured.
- The preprocessed image is then sent to the CNN model after being processed in different ways as described in proposed work.
- The CNN model compares the loaded picture to the trained images and predicts the sign using the labels with the highest probability from the trained model.
- CNN model cannot accurately predict labels when unprocessed images are fed directly to it.
- The main issue with the processing using CNN is its inability to cancel out the background properly. Hence, the images are required to be processed separately using various image processing techniques.

Explanation of Proposed Work

The numerous techniques applied to the images in our dataset are

- Grey Scaling
- Skin Masking
- Threshold
- Canny Edge Detection
- Convolution Neural Network

USES

- Understanding of gestures
- Simple communication
- convenient to use



INPUT



OUTPUT

Output of Grayscale



INPUT



OUTPUT

Output of Skin masking



INPUT



OUTPUT

Output of Threshold



INPUT



OUTPUT

Output of Canny Edge Detection

Explanation of Proposed Work

REASONS TO CHOOSE

- To improve communication for deaf and dumb people
- To communicate and understand feelings of disability people
- To make our verbal communication more clear to viewers.

ADVANTAGES

- Gesture are easier representation, makes the presentation attractive, Quick expressing of message, etc.
- Gestures are non-verbal communications.
- It can make the information to be presented easily via audio, visual, or even through silent.
- People can easily interpret the gesture of another person.
- Gestures are the main mode of communication hearing impaired persons.

Hardware & Software Involved

SOFTWARE INVOLVED

In particular the Convolutional neural network is used for better performance.

- The model is trained with static hand gesture images. The Convolutional neural network is created without using a Pre-trained model.
- For gesture recognition, the K-Nearest Neighbor (KNN) algorithm is a supervised machine-learning algorithm. KNN is used for classification, by which a data point's classification is determined by how its neighbor is classified.
- Touchless interface technology is used in hand gesture recognition and voice conversion.
- A Touchless user interface is an emerging type of technology based on gesture control. Touchless user interface (TUI) is the process of commanding the computer via body motion and gestures without touching a keyboard, mouse, or screen.
- The sensor-based solutions use accelerometers or gyros for detecting the gestures. This paper presents a hand gesture recognition system built around an accelerometer sensor. The system is made by a sensing and transmitting part and a computer.

Advantages & Applications

ADVANTAGES

- Easier representation
- Makes the presentation attractive
- Quick expressing of message.

APPLICATIONS

- Talking to computer
- Medical Operation
- Gesture-based Gaming control
- Gesture control car Driving
- Communication
- Hand gesture to control the home appliances like MP3 player, TV etc.

References

- Mitchell, Ross; Young, Travas; Bachleda, Bellamie;Karchmer, Michael (2006). "How Many People Use ASL in the United States?: Why Estimates Need Updating" (PDF).Sign Language Studies (Gallaudet University Press.) 6 (3).ISSN 0302-1475. Retrieved November 27, 2012.
- Singha, J. and Das, K. “Hand Gesture Recognition Based on Karhunen-Loeve Transform”, Mobile and Embedded 232 Technology International Conference (MECON), January 17-18, 2013, India. 365-371.
- D. Aryanie, Y. Heryadi. American Sign Language-Based Finger-spelling Recognition using k-Nearest Neighbor Classifier. 3rd International Conference on Information and Communication Technology (2015) 533-536.
- R. Sharma et al. Recognition of Single Handed Sign Language Gestures using Contour Tracing descriptor. Proceedings of the World Congress on Engineering 2013 Vol. II, WCE 2013, July 3 - 5, 2013, London, U.K.
- T.Starner and A. Pentland. Real-Time American Sign Language Recognition from Video Using Hidden Markov Models. Computational Imaging and Vision, 9(1); 227-243, 1997.

References

- M. Jeballi et al. Extension of Hidden Markov Model for Large Vocabulary of Sign Language. International Journal of Artificial Intelligence & Applications 4(2); 35-42, 2013.
- H. Suk et al. Hand gesture recognition based on dynamic Bayesian network framework. Pattern Recognition 43 (9); 3059-3072, 2010.
- P. Mekala et al. Real-time Sign Language Recognition based on Neural Network Architecture. System Theory (SSST), 2011 IEEE 43rd Southeastern Symposium 14-16 March 2011.
- Y.F. Admasu, and K. Raimond, Ethiopian Sign Language Recognition Using Artificial Neural Network. 10th International Conference on Intelligent Systems Design and Applications, 2010. 995-1000.
- J. Atwood, M. Eicholtz, and J. Farrell. American Sign Language Recognition System. Artificial Intelligence and Machine Learning for Engineering Design. Dept. of Mechanical Engineering, Carnegie Mellon University, 2012.

References

- L.Pigou et al. Sign Language Recognition Using Convolutional Neural Networks. European Conference on Computer Vision 6-12 September 2014.
- Y.Jia. Caffe: An open source convolutional architecture for fast feature embedding. <http://caffe.berkeleyvision.org/>, 2014. Lifeprint.com. American Sign Language (ASL) ManualAlphabet (fingerspelling) 2007.
- Das, A., Gawde, S., Suratwala, K., Kalbande, D. “Sign Language Recognition Using Deep Learning on Custom Processed Static Gesture Images”. 2018 International Conference on Smart City and Emerging Technology (ICSCET), (2018).
- Rao, G. A., Syamala, K., Kishore, P. V. V., Sastry, A. S. C. S. “Deep convolutional neural networks for sign language recognition”, (2018).
- Mahesh Kumar NB. "Conversion of Sign Language into Text". International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 9, (2018).



THANK YOU