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Survey Development of Artificial Neural Networks Based Sign Language Recognition System

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Abstract: *Sign language is means of communication. Some of them are not ever learn to sign language. This increases the isolation of deaf people and they may be confined in many of their express to communicate only with other deaf people. Preprocessing, feature extraction and classification are three issues in sign language recognition system. This work presents a method to improve the sign language recognition rate using Hough transform, Wavelet Transform artificial neural network. Hough transform and Wavelet Transform are applied to obtain features. Feed Forward Network trained by back propagation algorithm are developed to recognize sign images. Experimental results how that effectiveness of the proposed approach for sign language recognition with good recognition accuracy.*

Keywords: *Sign Language Recognition, ANN, Hand Gesture Recognition, Image segmentation, Support vector machine, Hidden Markov models*

1. INTRODUCTION

Recent developments in sensor technology, including the developments in the camera hardware and commercialization of web cameras, drive the research in Human-Computer Interaction to equip machines with means of communication that are naturally used between humans, such as speech and gestures. In research on using the speech modality to communicate with computers is more mature, studies on using the gesture modality is new technology. Signers are used in human communication and they form the basis of sign languages, the natural media of hearing-impaired communication. Signers are use aspect of human communication and they form the basis of sign languages, the natural media of hearing-impaired communication. Sign languages, like the spoken languages, emerge and evolve naturally within hearing-impaired communities. In each country or region, wherever hearing-impaired communities exist, sign languages develop, independently from the spoken language of the region. Every sign language has its own grammar and rules, with a common property that they are all visually perceived.

2. IMPORTANCE OF SIGN LANGUAGE

Sign language is the main mode of communication of hearing impaired people. It's fast and expressive way of communication. It's being a combining of hand shapes, movement of the hands, arms and body. It explore a full of facial expressions to full illustrate the speaker's thoughts. This language be used by communicating with hearing impairment of difficulty and wherever there is a community of people suffering from deafness, sign language develops. With complex spatial grammars, sign language is very different from the grammar use in spoken language, with hundreds of sign languages being in use across the world. Some sign languages have been granted legal recognition, and numbers of other forms of sign language have no status whatever.

3. SIGN LANGUAGE LINGUISTICS

Sign language to be a rich, complex language despite the widespread misconception they are not true languages. They are classified as sign languages have every linguistic component that is required as true languages. It's not mime, as is the misconception, but it will be considered to be conventional and arbitrary. It is more steps process and widespread in sign language as opposed to spoken ones, and they not have a visual rendition of an oral language. Its own complex grammar and can be used in discussions involving any type of subject. It encompasses the organization of elementary, meaningless units into a meaningful semantic unit. Sign languages comprise their Hand shape, Orientation, Location, Movement and Expression. They involved in deaf sign languages includes the extensive use of classifiers, a large degree of inflection and a topic-comment syntax. Unique linguistic features are emerging from sign languages ability to convey meaning in varying sectors of the visual field.

4. CLASSIFICATION OF SIGN LANGUAGES

The fact of sign languages are born with deaf communities like as normal person languages, they are different from the common person languages and feature it's a apart from their common structure of language at their circle. Signed language is the term to their environment, and better to know their optional for spoken language, that signed modes of spoken languages. And then, they belong own language like signed to communicate to public people spoken languages. For example most of sign signal language encoding of English to correspond with this. Due to lack of linguistic research, examine their genetic comparable between sign languages to public knowledge. Sign language play vital role to them via migration or deaf schools.

5. SIGN LANGUAGE IN HEARING COMMUNITIES

With group of a people in public languages, to elaborate the systematic their own efficient have been developed in their environment where they want to speak is not deemed practical or permitted, for example in religious communities, media environment, scuba diving, cricket, shooting, business exchange or in a entertainment game such as Charades. Many sports such as hockey and handball use sign language to convey their game trick to team mates or other staff. Recently, there has been developing them as by teach of sign language to disable to speak persons to learn, how to improve their effort to encourage their person to communicate effectively with signed languages long before they are capable of speech.

This is referred to as Baby Sign. Next to use sign language with a large number of non-deaf children with other causes of speech disability or delay for the obvious benefit of effective communication without having their speech. now onwards they use sign language it will be use full to them in to universal language where people can communicate with foreign speaking people effectively.

6. SIGN LANGUAGE RECOGNITION

Automatic speech recognition (ASR) is converting to a noise (sound) into sequence of editable formats (text). in that they have high a liability of the noise signal, speech recognition is known to be a though problem. Familiar decisions are in speech recognition are interdependent, as word and speech boundaries are not visible in the noise, and the talking rate varies. Therefore, decisions cannot be create independently but have to be made within a certain text, leading to recognize a whole stanza rather than single words.

7. AUTOMATIC SIGN LANGUAGE RECOGNITION

Sign languages are the most complex and birth form of languages could be dated back to as early of ancient civilization. It has started for emergency to convey their message. Since sign language has introduced and been adopted as an integral part of our daily communication process. Now, sign languages are being used practical to international sign for deaf and dumb, in the daily carrier and also at living places. It enhances with spoken language and helps to express their thoughts and feelings effectively.

Improving this application for disable speech people is very important, and also not able to read or write a normal communicating language. Commonly translation systems would make it

possible to communicate with deaf people. Compared to spoken, signed signals are efficient in their environments, probably where normal commands would be disturbing, as well as for expressing their information and relationships. The common solution to the sign language problem involves preprocessing, feature development and analyses/understand using classifiers.

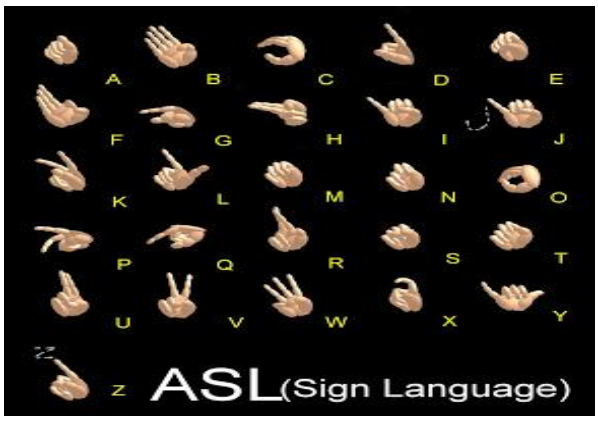

Table 1.

Methods	Description
Artificial Neural Network (ANN), Arabic Sign Language Recognition (ASLR). Graph Matching, Graph Isomorphism and Sub-Graph Isomorphism [27]	The recognition percentage is 90.5% for test set.
Self-organizing maps, Markov chains and Hidden Markov Models,image segmentation [12]	The architecture of the system is more robust and adaptive which uses SOM at the decoding stage
ASL, ASL recognition, ASL using ANN [34]	The system is able to recognize selected ASL signs with the accuracy of 92.33%
Skin color segmentation and Artificial Neural Network [23]	Experimental results show that the average recognition rate is 92.85%.
Multiple instance learning density matrix algorithm [8]	To evaluate the performance of the automatic sign extraction, hand posture classification, and spatiotemporal gesture spotting systems
SLR using Hidden Markov Models, SLR using hidden markov models [24]	Introduction of Point of Interest (POI) and track point provides novelty and reduces the storage memory requirement
Arabic Sign Language (ArSL) recognition, Hidden Markov Models, Sign Language Recognition [20]	The experimental results show that an accuracy of more than 95% can be achieved with a large database of 300 signs.
Indian Sign Language (ISL), Maximum Curvature Points (MCPs), Gesture recognition, BSpline [11] .	The system is suitable for complex ISL static signs. The experimental results show that the system is sufficient to claim a "working system" for native Indian sign language alphabet & numeral recognition
Indian sign language, fuzzy inference system,	System achieves a recognition rate of 96% with 10

wavelet transform [16]	different signer videos for 80 signs
Two-Dimensional Discrete Cosine Transform (2D-DCT) for image compression and the Self-Organizing Map (SOM) Neural Network [9]	The experimental results show that the system is sufficient to claim a "working system" for native Indian sign language alphabet & numeral recognition.
Arabic sign language; skin color segmentation; gesture recognition; face detection; correlation coefficients [22]	to encode the gesture and to differentiate between 20 different Arabic gestures collected from eight different signers, with an average recognition rate of 85.67%.
Sign Language Recognition, Artificial Neural Networks, Image Processing. [19]	The accuracy of the system could be also increased if a more robust skin detection algorithm will be used.
Artificial reality, gesture recognition, sign language, and neural networks.[6]	Improvements such as augmented and filtered data work are much effective.
Human Communication Interaction (HCI), Mouse replacement, American Sign Language, Artificial Neural Network, Gesture modeling [17]	The system will aid in the interaction between human and computer through the use of hand gestures as a control commands
Hand Gesture Recognition; Skin Filtering; Human Computer Interaction; Euclidean Distance (E.D.); Eigen value; Eigen vector.[15]	Improves the recognition rate compared to the previous works and achieved a success rate of 97%.
ASL character Hand gestures, Filtering Image, Edge Detection, and Image matching [28]	This System is to understand the human sign language and also user friendly human computer interfaces (HCI)
Sign language; Hand gesture; Computer vision; Human computer interaction. [29]	Physically impaired people's language identified by the hand gesture recognition system, which is also used to build an efficient human computer interaction system.
Gesture recognition, sign, boundary shape,cross section, skin color.[31]	low computational cost features for identification, and the system is easy to install and can execute in real-time.

8. CONCLUSION

Recognizing sign language is quite a challenging task, since sign language is a complex structure and we have to find the unique set of attributes to be able to determine whether a structure is a sign of a particular person or not. In this paper, ANN-based sign language recognition system models have been studied and compared.

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