ISSN XXXX XXXX © 2017 IJESC

Research Article Volume 7 Issue No.9

A Video Based Sign Language Recognition System

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Abstract:
The focus of this project is to develop a system to aid verbally challenged people. In this work, we present a way to classify sign gestures using a video as input and the text/speech is the output. The video is divided into many frames and the person performing the gesture is identified as a subject. After this, the background is eliminated and detection of the hand of the subject is performed in every frame of the given video. Upon identifying the hand region of each frame, the movement of the hand is tracked. This motion data is then aggregated and represented in the form of interval-valued data. A suitable interval based classifier is generated based on this information. Testing can then be performed to obtain the efficiency of the given system. The given testing input is checked to be within the range of given interval values and then confirmed to be a certain gesture.

I. INTRODUCTION

OBJECTIVE

About 3% of the population in India are lacking in verbal capability. On the other hand, from the human perspective the most basic and natural way to interact with the computer is through speech and gesture interface. Thus, the research of sign language and gesture recognition is likely to provide a shift-paradigm from traditional point of click, user interface to a natural language dialogue and spoken command-based interface. Therefore SLR, as one of the important research areas of human-computer interaction (HCI), has attracted more and more interest to researchers to show interest in HCI society.

SCOPE

- The studies examine the benefits to recognize 26 ASL alphabets using static hand gestures along with natural lightning condition.
- This recognized 15 isolated dynamic gestures. The recognition rate obtained was 98%.
- The accuracy of optimum distance of kinect sensor which applies to recognize the thai finger-spelling was proposed. There are 16 gestures were done between sensor and signer.
- An approach to address the inter-class ambiguity issue in ISL alphabet recognition
- The videos were manually segmented to extract one frame with a frontal and one with a lateral view of the hand.

II. SYSTEM ARCHITECTURE

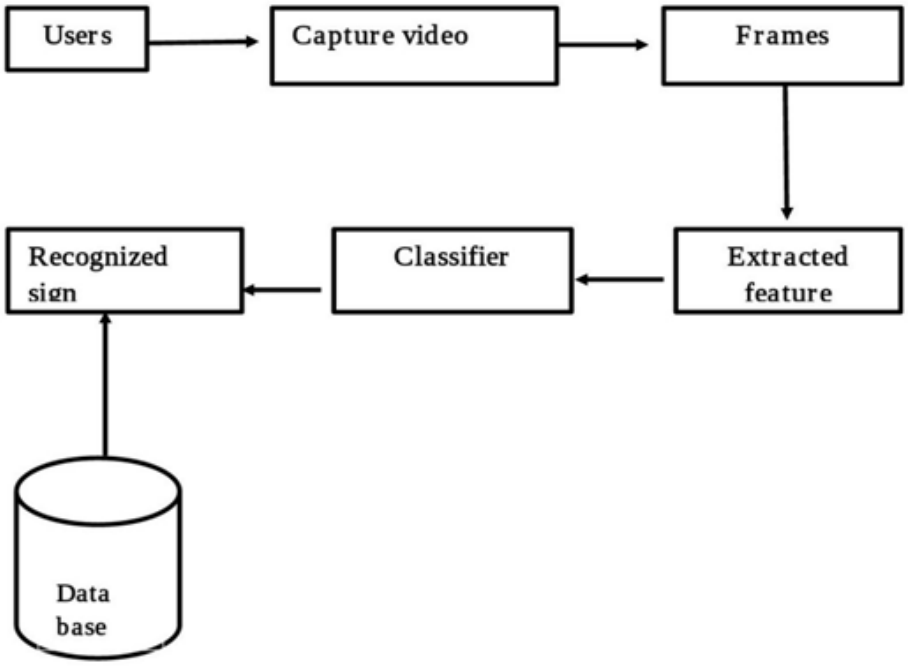

Figure.1. System Architecture

EXISTING SYSTEM

In recent decades, due to computer software and hardware technologies of continuous innovation and breakthrough, the social life and information technology have a very close relationship in the twenty-first century. In the future, especially the interfaces of consumer electronics products (e.g. smart ssphones, games and infota1inment systems) will have more and more functions and be complex. How to develop a convenient human machine Interface (Human Machine Interaction/ Interface, HMI) for each consumer electronics product has become an important issue. The traditional electronic input devices, such as mouse, keyboard, and joystick are still the most common interaction way. However, it does not mean that these devices are the most convenient and natural input devices for most users. Since ancient times, gestures are a major way for communication and interaction between people. People can easily express the idea by gestures before the invention of language. Nowadays, gestures still are naturally used by many people and especially are the most major and nature interaction way for deaf people. In recent years, the gesture control technique has become a new development alter end for many human-based electronics products, such as computers, televisions, and games.

DISADVANTAGES OF EXISTING SYSTEM

- ❖ Recognition rate of cluttered background was less and lighting condition was mixed.
- ❖ In Hidden Markov language the normal hands were not recognized.
- ❖ The hand occlusions were unaddressed.
- ❖ Detecting only for the small distance images and greater distance will make the image less bright.
- ❖ Template matching mechanism is extremely time consuming, and better methods of classification exist.

III. PROPOSED SYSTEM:

Most gesture recognition methods usually contain three major stages. The first stage is the object detection. The target of this stage is to detect hand objects in the digital images or videos. Common image problems contain unstable brightness, noise, poor resolution and contrast. The better environment and camera devices can effectively improve these problems. However, it is hard to control when the gesture recognition system is working in the real environment or is become a product. Hence, the image processing method is a better solution to solve these image problems to construct an adaptive and robust gesture recognition system. The second stage is object recognition. The detected hand objects are recognized to identify the gestures. At this stage, differentiated features and effective classifiers selection are a major issue in most researches. The third stage is to analyze sequential gestures to identify users' instructs or behaviors.

ADVANTAGES OF PROPOSED SYSTEM

- ❖ Nature of information is to communicate with the people in a multiple way.
- ❖ Signing vary from person to person.
- ❖ Presence of disturbance(surroundings furniture, cloths)
- ❖ There is no international Sign Language and it always differs from region to region.
- ❖ Lack of written form of sign language rules and gestures.

IV. IMPLEMENTATION

MODULES

- ❖ Preprocessing
- ❖ Feature Extraction
- ❖ Classification

MODULES DESCRIPTION

- ❖ **Preprocessing:**

The preprocessing contains two steps
1) Segmentation 2) Binarization

1) Segmentation

The video are segmented into frames. The segmentation is the process of partitioning a digital image into multiple segments. The segmentation is to simplify or change the representation of an image into more meaningful and easier to analyse.

2) Binarization

All the grey scale images are binarized with the help of algorithms the algorithms should work well for images with complex background. Here key frame extraction is performed on the basis of a histogram to identify the essential frames needed in order to classify the given gesture video.

- ❖ **Feature Extraction:**

Here Kalmanfilter algorithm is used to track the object. The Kalman filter keeps track of the estimated state of the system and the variance or uncertainity of the estimate. The estimate is update using a state transition model and measurements. Denotes the estimate of the system's state at time step k before the k-th measurements has been taken into account is the corresponding uncertainty.

- ❖ **Classification**

Sign language recognition a sign may begin or end anywhere in a given observation sequence. As the sign boundaries cannot be detected accurately, all possible beginning and end points have to be accounted for. Furthermore, the number of signs within a sentence is unknown at this time.

V.CONCLUSION

As we can see from the above article, we have got algorithms which, first of all, allow us to extract moving objects from a video feed and, second, to successfully recognize hands gestures demonstrated by the object. The recognition algorithm is very simple and easy for the implementation, as is for understanding. Also, since it is based only on information from histograms, it is quite efficient in performance, and does not require a lot of computational resources, which is quite important in cases where we need to process a lot of frames per second. We developed a system for recognizing Indian sign language that works in real-time the work was accomplished by training a fuzzy inference system by using features extraction using kalman filtering by

different signer videos for different signs with a recognition rate of 96%.

VI. FUTURE ENHANCEMENT

As the time passes there is change in technology. This system is flexible to accommodate technological changes, which is very important. This is one of the issues, which can be considered in the future.

In future we can include the following enhancements:

- The better environment and camera devices can effectively improve detect hand objects
- by using better system is to provide an efficient and accurate mechanism to translate sign language into text or voice format

VII. SYSTEM REQUIREMENTS:

HARDWARE REQUIREMENTS

- Processor: INTEL Pentium 4
- RAM:2GB
- Hard Disk drive:20.6GB

SOFTWARE REQUIREMENTS

- Web Camera- (320*260 minimum)
- Operating system - android OS
- Matlab R2013 x64

VIII. REFERENCE:

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