HAND GESTURE RECOGNITION AND VOICE CONVERSION FOR DEAF AND DUMB

Abstract:

Individuals primarily communicate with one another. Blind and deaf people use sign language to communicate with others. These individuals have difficulty communicating their message to ordinary people. Deaf and blind people believe they are unable to communicate because of a lack of communication skills, and as a result, they are unable to express their emotions. Because most individuals aren't educated in sign language, communicating in an emergency can be extremely challenging. **As a consequence, the challenge may be solved by converting hand gestures into human-hearing sounds and text.** Vision and non-vision approaches are two of the most commonly used methods for detecting hand movements or gestures. In a vision-based approach, a camera will be used for gesture detection, whereas sensors will be employed in a non-vision-based technique. **In this study, a vision-based technique was used.** This device detects and locates hand motions in order to keep a communication channel open with others. Using convolutional neural networks, this research develops a gesture recognition system. This study looks into the advantages and disadvantages of hand motion recognition.

Existing System:

The existing system for the project is **Support Vector Machine (SVM)**. The data is divided into two or more categories using the **Classifier model** which is a supervised learning method based on kernels. For binary classification, SVM was developed and utilized. Support vector machines' training step involves building a model, mapping each class's decision boundaries, and locating the hyperplane that divides the various classes. By enhancing the hyperplane margin, the distance between the classes may be increased while maintaining classification accuracy. The implementation's core is libsvm. The fit time complexity is more than quadratic with the number of samples, making it difficult to scale to datasets with more than a few tens of thousands of samples. The management of the multiclass support is done using the one-vs-one approach.

Disadvantages of Existing System:

- SVM is less adaptable. SVM requires handcrafted feature extraction which can be time-consuming and challenging.

- SVM has less interactive user interface.
- SVM has lower recognition capability.
- SVM is less efficient and less accurate.

Proposed System:

The system we propose for the project is **Convolutional Neural Networks (CNN)**. The recommended model is **Sequential model** because this deep learning model is founded on a sequence of layers. The model passes information from the input layer to the hidden layer and finally to the output layer. Convolution's main goal is to find the features in our image using a feature detector and arrange them in a feature map in order to retain the spatial link between pixels.

Advantages of Proposed System:

- CNN is more adaptable. CNN can learn more complex features directly from raw data, which can save time and effort in feature extraction.
- CNN has more user-friendly interface compared to SVM. It will be designed to be easy to use for individuals with no technical expertise and it will provide clear feedback on the recognized gestures.
- CNN has higher recognition capability than SVM. CNN is a deep learning model that can automatically learn and extract features from data, which can lead to better performance in complex tasks like hand gesture recognition.
- CNN is more accurate and more efficient when compared to SVM.

System Requirements:

The following are the hardware and software requirements needed to develop the project:

A. Hardware Requirements:

Processor	Pentium- IV
Speed	1.5 GHz
RAM	256 MB (minimum)
Hard disk	20 GB
Keyboard	Standard Windows Keyboard
Mouse	2 or 3 Button Mouse
Monitor	SVGA

B. Software Requirements:

Operating System	Windows 7 or 8
Programming Language	Python

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