

Hand Gesture Recognition and voice, text conversion using CNN and ANN

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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 and artificial neural networks, this research develops a gesture recognition system. This study looks into the advantages and disadvantages of hand motion recognition.

Keywords—Hand gesture, Gesture Recognition, Sign Language, Dumb and Deaf, Feature Extraction, Deep Learning, Webcam, Image Pre-processing.

I. INTRODUCTION

Sign language is becoming more popular as a technique to communicate with those who are unable to communicate verbally. It is a language in which hand motions are used to express alphabets and words. The vision technique has been the most extensively used method for sign recognition in recent decades. It's a technology that uses a camera to identify data transmitted by finger motions. It is the most commonly used visual-based method. Vision-based sign recognition systems have taken a lot of time and effort to develop all over the world. The two vision-based gesture recognition systems are direct and indirect. Previously, for the recognition of hand gestures, a vision-based approach was used. However, the ambient influence on the detected picture is significant in this

approach. The hand motion is detected and converted into speech and text.

One of the most important challenges that this one-of-a-kind personality suffers from is the communication gap between a disabled person and an ordinary person. Due to a lack of communication, deaf and dumb people are unable to express their feelings. Hand Gesture Recognition and Voice Conversion (HGRVC) technology identifies and monitors the hand motions of the deaf and dumb, allowing them to converse with others. Webcams are used to detect hand movements. With the help of pre-processing, the images are then converted to normal size. The goal of this study is to create a system that can translate hand gesture into speech and text. Hand gesture is analysed as part of the identification. The technology provides text output, which helps deaf people, and also speech output, which helps blind people and humans communicate more effectively.

A. Problem Statement

To communicate with the wider public, deaf and blind people rely significantly on sign language. Those persons find it challenging to express their message to regular people. Due to a lack of communication, deaf and blind people are unable to transmit and express their feelings. Hand signals can be converted into human voice and writing to remedy the problem. People engage with one other mostly through communication. Dumb and blind persons use sign language to communicate with those who are not deaf or blind. Those individuals find it extremely difficult to communicate their message to the general public. They are uneasy about taking on such a massive task. Dumb and blind individuals believe they are unable to communicate because of a lack of communication, and as a result, they are unable to convey their emotions. Because most individuals aren't trained in sign language, communicating their message in an emergency is extremely challenging. As a result, the solution to this challenge is to transform hand movements into human hearing voice and text.