

KANNADA SIGN LANGUAGE RECOGNITION USING MACHINE LEARNING

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Abstract - The literature contains many proposed solutions for automatic language recognition. However, the ARSL (Arabic Sign Language), unlike ASL (American Sign Language), didn't take much attention from the research community. In this paper, we propose a new system which doesn't require a deaf wear inconvenient devices like gloves to simplify the method of hand recognition. The system is based on gesture extracted from 2D images. The scale Invariant Features Transform (SIFT) technique is employed to achieve this task because it extracts invariant features which are robust to rotation and occlusion. Also, the Linear Discriminant Analysis (LDA) technique is employed to solve dimensionality problem of the extracted feature vectors and to extend the separability between classes, thus increasing the accuracy of the introduced system. The Support Vector Machine (SVM), k-Nearest Neighbor (kNN), and minimum distance are going to be used to identify the Arabic sign characters. Experiments are conducted to test the performance of the proposed system and it showed that the accuracy of the obtained results is around 99%. Also, the experiments proved that the proposed system is strong against any rotation and that they achieved an identification rate concerning 99%. Moreover, the evaluation shown that the system is such as the related work.

Key Words: SIFT, LDA, KNN, ARSL.

1. INTRODUCTION

A sign language may be a collection of gestures, movements, postures, and facial expressions similar to letters and words in natural languages. So, there should be the way for the non-deaf people to recognize the deaf language (i.e., sign language). Such process is understood as a sign language recognition. The aim of the sign language recognition is to supply an accurate and convenient mechanism to transcribe sign gestures into meaningful text or speech so communication between deaf and hearing society can easily be made. To achieve this aim, many proposal attempts are designed to create fully automated systems or Human Computer Interaction (HCI) to facilitate interaction between deaf and non-deaf people. There are two main categories for gesture recognition glove-based systems and vision-based systems. Glove-based systems: In these systems, electromechanical devices are

accustomed collect data about deaf's gestures. With these systems, the deaf person should wear a wired glove connected to many sensors to gather the gestures of the person's hand.

1.1 PROBLEM DEFINITION

The traditional existing system for sign language recognition is based on mainly hand recognition techniques, which were useful in communicating the words between the normal people and deaf people. The combinational use of sign and behavior signals used in our project helps in identifying what the person is trying to communicate. So much helpful in security concerned field. Based on various signs we can communicate with the person with more accuracy using many instance learning algorithms. Using hand recognition, we can communicate with a deaf person and dumb person to display weather it is letter, word or trying to convey something. This software system is designed to recognize the hand using gesture. The system then computes various hand parameters of the person's gesture. Upon identifying and recognizing these parameters, the system compares these parameters with gesture for human communication. Based on this static gesture the system concludes the person's communication state.

1.1 OBJECTIVE

The main objective of our project is to make the communication experience as complete as possible for both hearing and deaf people. The work presented in Indian Regional language, Kannada, the goal is to develop a system for automatic translation of static gestures of alphabets in Kannada sign language. Sign of the deaf individual can be recognized and translated in Kannada language for the benefit of deaf & dumb people.

1.2 SCOPE

Communication forms a very important and basic aspect of our lives. Whatever we do, whatever we say, somehow does reflect some of our communication, though may not be directly. To understand the very fundamental behavior of a human, we need to analyze this communication through some hand gesture, also called, the affect data. This data can

