

# Real-Time Recognition of Indian Sign Language for the Deaf and Blind

Tirupathi Konreddy<sup>a)</sup>, D Raghava kumari, M Anitha, Srinivas Kasanagottu

*Sumathi Reddy Institute of Technology for Women, Warangal, Telangana state, India, 506371.*

<sup>a)</sup> Corresponding author: konreddyt@gmail.com

**Abstract.** A system which recognizes hand poses and gestures from the Indian Sign Language (ISL) in real time using grid-based features is presented in this paper. An attempt is made to minimize the gap between the hearing and speech impaired and the rest of the people in the society. The solutions that are existing now neither provide relatively high accuracy nor do good work in real time. Good results on both these parameters are provided in this paper. Some gestures and 33 hand poses from the ISL can be identified using grid-based features. A smart phone camera is used to capture the sign language and are transmitted to remotely placed server in the form of frames. It is user friendly and external hardware usage is thus avoided. For hand detection and tracking, techniques such as skin color segmentation, face detection and object stabilization are used. Further to represent the hand's pose in the form of feature vector, the image grid-feature extraction technique is implemented on the image. K-nearest neighbors' algorithm is used to classify the hand poses. Hidden Markov Model chain is fed with the motion and observation sequence of intermediate hand poses to classify the gestures in which 12 gestures are predefined in ILS.

Key words: Sign language, Hand gestures, HMM model, classification of poses.

## INTRODUCTION

Indian Sign Language (ISL) is a method of providing communication between hearing and speech impaired and normal people. In this paper, the research is related to ISL which is defined in talking hands website [1]. ISL makes use of gestures to represent the complex words and sentences. It consists of 33 hand poses which includes 23 letter and 10 digits. Gestures are used to represent letters 'h' and 'j' and letter 'y' looks like digit 2. The system which is trained based on the hand poses are shown in Fig 1.

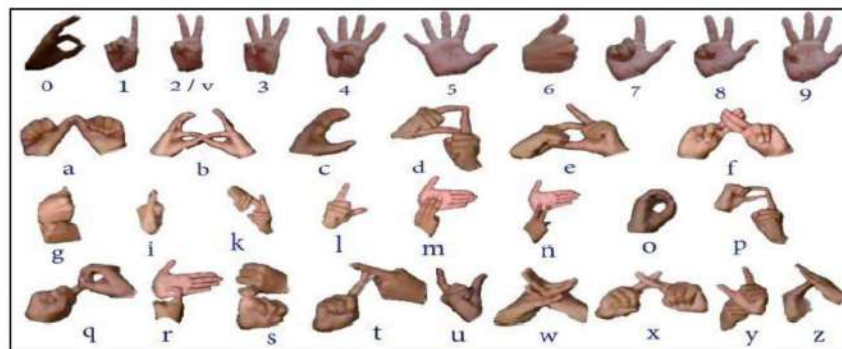


FIGURE 1. The system which is trained based on the hand poses

Many of the people found it difficult to interpret with gestures of ISL. This has led to create a barrier for communication among the who aware of ISL and who do not. An interpreter who is needed to translate the gestures whenever it is required may not be found always at any time. In order for providing a real-time communication, it is required to implement a solution which could be able to translate gestures and poses pertaining to ISL. The solution