Sign language is the only medium of communication for hearing-impaired people and hard hearing community. This is also helpful in communication between speaking community and who cannot speak. Although around 5% of the world population uses sign language as the medium of communication to the normal speaking community, still there is a need of a system which can interpret sign language gestures to corresponding text or speech. This will be helpful to both communities to exchange information in various practical situations. The sign language of a particular country or subcontinent differs with other countries or subcontinent. In India, the sign language is known as Indian Sign Language (or ISL). English and Hindi are officially accepted sign languages in India.

The focus of this research is on computer recognition and translation of ISL in English language domain. A sign language recognition system can be based on a device based approach or vision based approach. Due to problems in device based recognition systems, the work presented in this thesis is on vision based computer recognition of ISL. This will be beneficial for better interaction to the unblessed community at common platforms. Data sets on ISL digits, alphabet and a limited number of words are created, since no standard data sets are available in this field. The data set proved to be sufficient, in terms of the number of training as well as testing samples, which is compatible with experiments having feature vectors and classifiers available. Further, the data sets are tested on various combinations of feature extraction methods and classification techniques in order to obtain standardization in terms of data set, recognition accuracy and consistency.

Some pre-processing steps and feature extraction techniques (histogram features, structural features and feature vector inherited directly from an image matrix) in the pattern recognition process for performance improvement are devised. A new pattern recognition process for video data set is proposed and is useful in recognition of dynamic gestures of ISL. The thesis contains six chapters. Chapter I is about identification and introduction of the research topic. Research contributions till date in this field are discussed in chapter II. The detailed methodology followed in conducting experiments is discussed in chapter III. The design and working of the proposed system is discussed in chapter IV. Testing and evaluation of data sets are described in chapter V. Finally, in chapter VI, the conclusions derived from the experiments are discussed. Six research papers have been published (five published and one accepted) out of this research.