

# **OCR and Speech Recognition for Oriya Language**

Sanghamitra Mohanty  
Department of Computer Science and Application  
Utkal University, Bhubaneswar 751004, India.  
Email: sangham1@rediffmail.com

## **Abstract**

Optical Recognition System and Speech recognition system are the technology part which can be of immediate help to a person with out deep knowledge of the language or English. We have used the Neural Network technique in both the cases for making it noise free and also for the recognition. Our effort is towards the integration of the OCR system to Speech Recognition system to make effective use of both.

## **1. Optical Character Recognition**

Automatic recognition of alphabetic characters through computers is a basic need for text recognition in different languages. OCR systems for different foreign languages like Japanese, Chinese and Korean are already on. For Indian languages attempts are made for Devnagari, Gurmukhi, Marathi, Bengali, Telugu and Tamil. We are making an attempt to develop the OCR system for Oriya language, which is the official language of Orissa, a State in India.

We have used the Back propagation Neural Network for efficient recognition where the errors are back propagated by feed-forward method in the neural network of multiple layers, i.e. the input layer, the output layer and the middle layer or hidden layers. In the network the neural connections go from a vertex to one with a higher number. This is the back propagation where the gradient vector of a fitting criterion for a feed-forward neural network with respect to the parameter or weights

Before this we have applied the Region growing (labeling and counting) method for the extraction of characters involving the size and position. We have also used the skeletonization technique for efficient storing and fast searching. Zooming technique is applied for converting any font to our standard font making our system efficient to handle omni font.

Moreover we have also taken care of processing of colored documents i.e. noised documents like old papers having yellowish color or other printing errors like spots etc. This is being done, taking into consideration the RGB factor of the colored document. In the first phase the colored document is converted to gray tone and then to two tone making the threshold value domain specific.

Integration of all these factors helps us to have an efficient OCR system.

## **2. Speech Recognition**

Speech Recognition is both speech and speaker oriented. They have fuzziness in them, making the recognition system hard for understanding. During the recognition of speech signals separation of words which is a combination of pure consonants, vowels and conjuncts of consonants and vowels are done in the first phase. We have tried to separately store the consonants and vowels and then recognize them. This is being done exploiting the purely phonetic nature of Oriya language.

Oriya alphabetic character signals are analysed for phonemes (pure consonant and vowels). Different parameters like amplitude, pitch, frequency, time period for each signal are analysed and related properly after reducing the noise part in those. For noise extraction FFT is applied to the convolution factors of the speech signal. Next the LMS algorithm is used for the creation of a standard speech database. The standardization of all the phonemes are then mapped to speech for Text to speech recognition. After is done successfully it can also be done just with inverse algorithm for Speech to text. We have planned to integrate the OCR and Speech Recognition systems for efficient Automatic Recognition system for the Oriya language. This is possible with our system as our analysis of speech is phoneme based and OCR is pure pattern recognition based.

### **3. Conclusion**

Efforts are on for completion of both OCR and Speech systems and we hope an integration of both the systems will help the real needy persons like illiterate and blind persons in the first hand and of course the Offices of Orissa towards office automation or e-governance at length.