

Urdu Online Handwriting Recognition

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Abstract

Handwriting has continued to persist as a mean of communication and recording information in day-to-day life even with the introduction of new technologies. **Urdu Online Handwriting Recognition System** converts user hand written information into Urdu text. This allows natural writing just like it can be written on paper. Urdu is a complex language, features of Urdu which make it more difficult than English are: characters that vary from each other on the basis of small changes in their shape and the hat feature that carry very important information because based on type and number of these hat feature above or below the basic structure, the character can turn into a new character with different sound. Although average length of character is less but it in turn increases the overall complexity and provide less context to alleviate this problem. The system performs the recognition of 39 Urdu characters, 10 numerals and 200 words (two character words). The working of recognition system is based on analytical approach to segmentation for feature extraction (Figure 1), rule based slant analysis for slant removal (Figure 2) and tree based dictionary search for classification (Figure 4). Hat feature recognition (Figure 3) is 98%. The proposed tree search technique reduces the search space up to 96.2% and is therefore significantly faster than searching techniques, in which we have to process the whole dictionary to come up with the correct answer. The system has recognition rate of

93% for isolated characters, 93% for numerals and 78% for two character words. Urdu Online handwriting recognition system GUI is shown in figure 5 and System Analyzer for the calculation of recognition accuracy is shown in Figure 6.



Figure 1



Figure 2

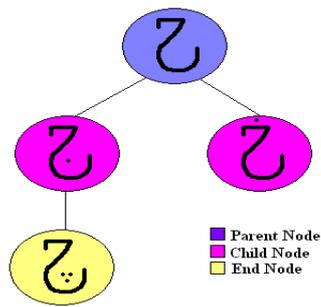


Figure 3

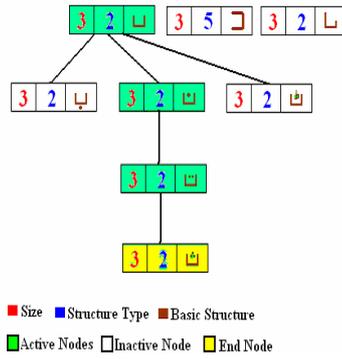
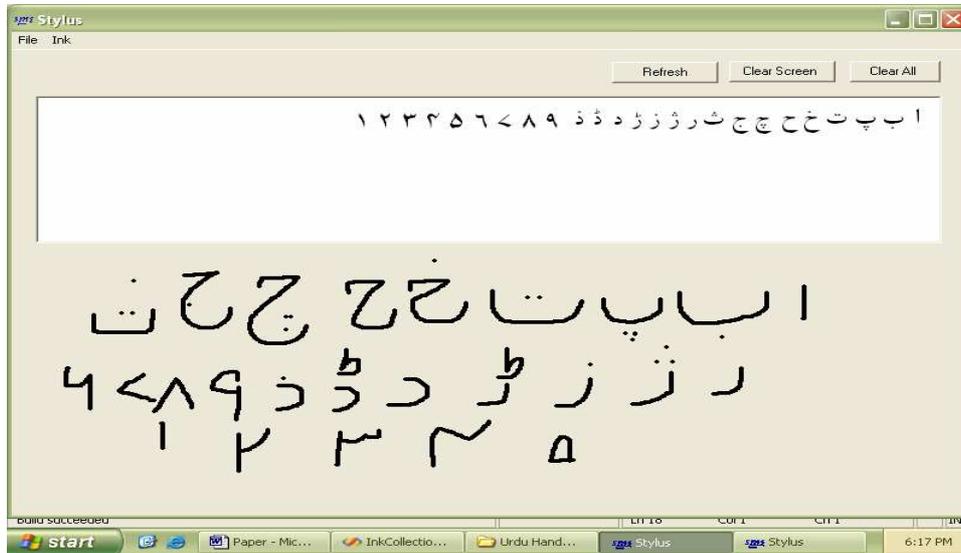
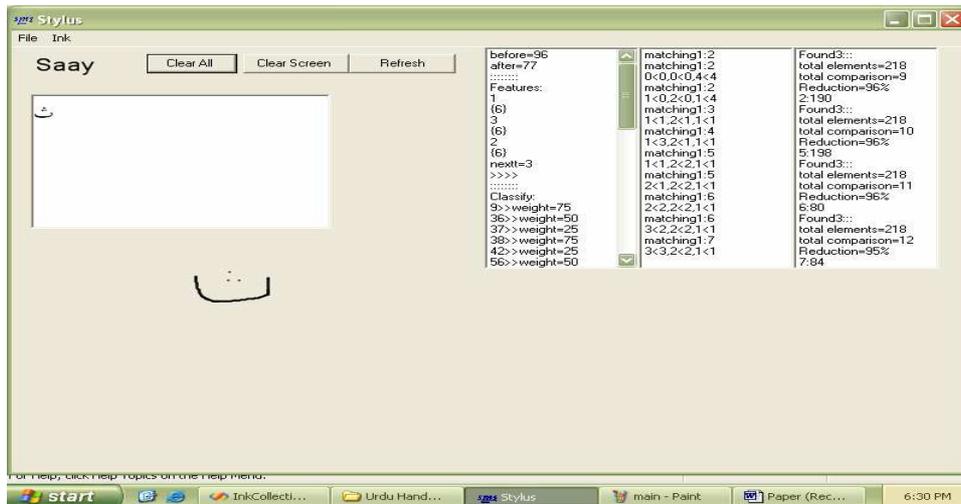


Figure 4



Urdu Online Handwriting Recognition System (Figure 5)



System Analyzer (Figure 6)