IBM PROJECT

A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

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Literature Survey:

For the categorization of Devanagari numerals, **R. Bajaj, L. Dey, S. Chaudhari**. used three distinct types of characteristics: density features, moment features, and description component features. They suggested connectionist multiclassifier architecture for enhancing the recognition reliability, they were able to recognise handwritten Devanagari numbers with an accuracy of 89.6%.

A way to create a handwritten Tamil character by making a series of strokes was presented by **Aparna**. A stroke was represented as a string of form characteristics using a structure-based or shape-based representation. A flexible string matching process was used to compare this string representation with a database of strokes in order to identify an unidentified stroke.

The idea of SVM-based offline handwritten digit recognition was put out by **Renata F. P. Neves**. According to authors, SVM performs better than a multilayer perceptron classifier. Utilizing the NIST SD19 standard dataset, the experiment is run. MLP has the benefit of being able to divide classes that are not linearly separable. MLP, however, is prone to falling into a local minimum zone, where the training will end presuming it has reached the best position on the error surface. Determining the optimum network design to handle the issue while taking into account the number of layers and perceptrons in each

hidden layer is another challenge. A digit recognizer employing the MLP structure may not deliver the expected low error rate as a result of these drawbacks.

Kannada characters have a system that is described by **Ragha & Sasikumar**. In this study, the Gabor wavelets of 49 character-preprocessed pictures are used to extract the moment characteristics. On a multi-layer perceptron with back-propagation neural network, the moments characteristics of four directional pictures are checked against the original images. With these two capabilities together, the system performs 92% of the time on average.

In this research, **Salvador Espaa-Boquera et al**. present a hybrid Hidden Markov Model (HMM) model for offline handwritten text recognition under unrestricted conditions. In this, a Multilayer Perceptron is employed to estimate the emission probabilities, and Markov chains were used to simulate the structural portion of the optical model. In this study, several strategies are used to normalise the size of text pictures and remove slope and slant from handwritten text using supervised learning techniques. The main goals of this recognition system were to create an ANN-based preprocessing and recognition system with excellent accuracy.

In their paper, **M. Hanmandlu and O.V. Ramana Murthy** describe how to recognise handwritten Hindi and English numbers by modelling them as exponential membership functions, which act as a fuzzy model. The acknowledgment is done by

The fuzzy sets' exponential membership functions were modified. These fuzzy sets are created using features that are made up of Box approach-obtained normalised distances. Two structural parameters that are calculated by maximising entropy with the condition that the membership function is attained to unity modify the membership function. The total recognition percentage for Hindi numerals is 95%, and for English numerals it is 98.4%.

A paper on the use of genetic algorithms to choose characteristics for character recognition was delivered by **Yoshimasa Kimura**. The author suggests a unique approach for feature selection in genetic algorithms for character recognition (GA). The suggested strategy utilises a reduction ratio in the amount of features utilised for recognition as the fitness value and only chooses genes as candidates for the parent gene for which the recognition rate of training samples exceeds the set threshold.