DECORATIVE TEXT WORDS RECOGNITION USING NEURAL NETWORK

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Abstract:

Use of the decorated text is highly preferable in the area where the attention of viewers is required. The basic optical recognition systems do not give good results for the decorated inputs because the formation of decorated text is complex and different from the other regular fonts. Very less work has been done in the field of decorated text and specially decorated words. In this paper algorithm has been designed which work for the recognition of decorated words. The proposed system uses the neural network for the recognition and consists of the following portion. First is Otsu's algorithm, then applying preprocessing, neural network and finally the matched decision is displayed.

Keywords- *Text recognition, Neural network, Otsu's algorithm*

INTRODUCTION

Decorated text which includes characters and words also are very much used in different types of documents.[1][2] Basic optical character reader need not only to deal with ordinary and regular data but also has to face the decorated text which are available on many areas like posters, invitation cards, various advertisements, on the walls of various play schools, on vehicles etc. Mostly the decorated text fonts are used purpose where the attraction of reader is required[1][3].For decorating the text various methods can be used like using various textures, multiple colors, different font styles using accessories on text. Many techniques for character recognition have already been developed, but appearances and formation of decorated text are very complicated and different from regular text [6][7]. Also, it is difficult to create particular patterns and method for decorated text since there are various kinds of fonts that are specially designed[2]. Therefore, the general created character recognition systems cannot give much good results on decorated text. The information available nowadays are present in the form of papers, posters, multimedia, videos etc. highly increased elements of multimedia technology in real life has resulted in the increase of text decoration to make the document more colorful and which attracts the attention of the reader[10][12]. Presence of decorated text documents appears very beautiful but also the decoration decreases the readability.

In this paper the neural network has been used for the recognition of the decorated text words. Neural network uses the training and testing portion. In the training part the system has to be trained with particular set of characters and in the testing part the testing of the system is done.

Fig 1. Decorate text image

Fig 2. Text image with decorated font

PROPOSED METHODOLOGY

The proposed algorithm for the recognition of decorative words uses the preprocessing, Otsu algorithm, and the neural network for the recognition of the decorated words.

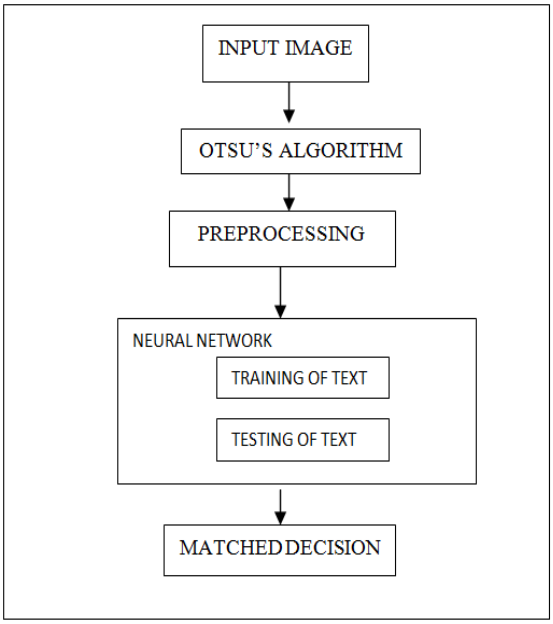


Fig 3. Proposed algorithm for recognition of decorative words

1. Input image

The input image is given to the system here. The input image is the decorated text words.

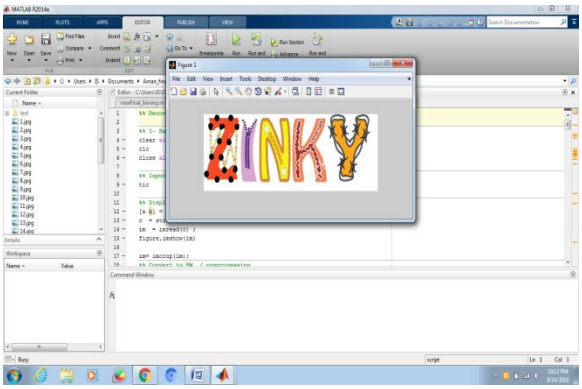


Fig 4 .input decorated word image

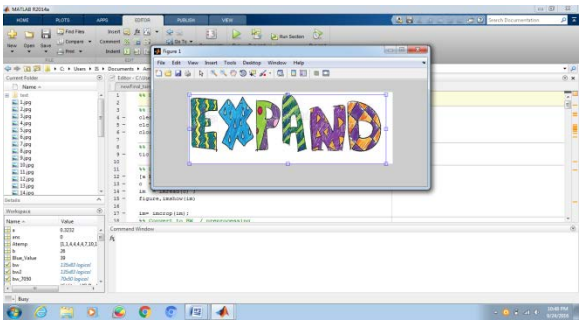


Fig 3. Decorated word image taken for testing

2. Otsu's algorithm

The next step is to apply Global image threshold using Otsu's algorithm. It chooses the threshold so that the intraclass variance of the thresholded black and white pixels are minimized.

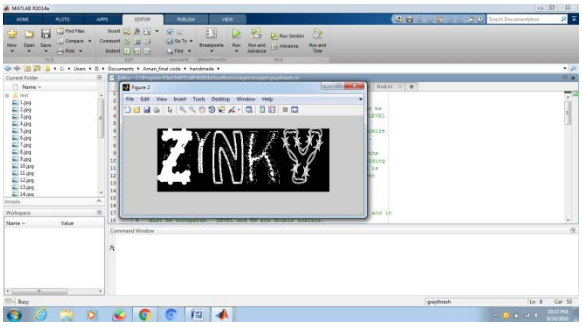


Fig 4. Thresholding of decorated word image

3. Preprocessing

Preprocessing involves only the conversion of colored image to BW, then finding the boundaries of the image, after that finding the blank spaces in all four directions that are left, right, lower and upper side. Once all done the image is cropped.

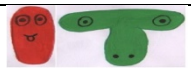
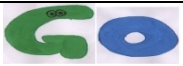
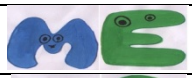
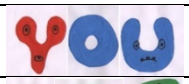
4. Neural network

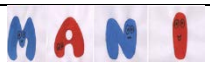
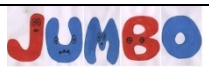
This phase has two parts training and testing. In training part the set of characters are trained at the neural network. In the training portion only character sets are trained. In the testing part the input word image is tested. In the testing portion the testing of single character as well as testing of words can be done. The input image may or may not be the same as the training data set.

5. Matched decision

After the testing has been done the matched decision will be displayed.

RESULTS

S.N.O	Word picture	Number of characters in a word	Identified characters
1		2	1
2		2	1
3		2	1
4		2	2
5		2	1
6		2	0
7		2	1
8		2	0
9		2	0
10		2	2
11		3	2
12		3	2
13		3	1
14		3	0
15		3	1
16		3	0
17		3	0
18		3	1
19		3	0

20		3	2
21		4	2
22		4	1
23		4	1
24		4	1
25		4	3
26		4	2
27		4	2
28		4	0
29		4	1
30		4	3
31		5	0
32		5	1
33		5	3
34		5	4
35		5	2
36		5	2
37		5	0
38		5	0
39		5	2
40		5	1
41		6	4

42		6	5
43		6	2
44		6	2
45		6	0

The above results are obtained using Otsu's algorithm, preprocessing algorithm, neural network. The first phase is applying the Otsu's algorithm which takes the word image as input and then applies few steps on the input given. This algorithm is to choose the threshold value. Matrix is returned which contains the labels for the connected components. The elements of the matrix are integer values which are greater than or equal to 0. The pixels which are labeled 0 is considered as background and the pixels labeled 1 are considered as character 1, pixels labeled 2 are considered character 2 and so on. The labeled pixels are then sent to the preprocessing algorithms then finally sent to the neural network. Matching is done between the features of input and the saved feature file. The matching is done with the help of the neural network which uses artificial intelligence. The maximum similar and matched element will be displayed as result.

After applying the proposed algorithm of text recognition on various text words we found 40-50% average results accuracy rate. For experiments the text images with complex background were also taken.

CONCLUSION AND FUTURE WORK

Text recognition system has wide use decorated text because not all the fonts that are fed to the recognition system as input are regular fonts. Very less work has been yet done for the recognition of the decorated words. In this paper a system is proposed so as to recognize the decorated words using neural network. Phases like applying Otsu's algorithm, preprocessing, then neural network training and testing has been applied for the recognition of the text words. Various decorated text word images for testing has been taken for testing and we found average results. The works was done only for the single characters before. This approach deals with the recognition of complete words. As this is totally a new area of research so a huge work can be done in this field. As for now the algorithm works only for those words which not fully connected. The practical OCR does not only deal with the words which are not connected also it has to deal with the words which are connected so the algorithm of segmentation can also be applied in the future to overcome this limitation and to improve the accuracy rate. Due to the increase in the multimedia the decoration of text has also been increased. Decorated text present in various advertising videos, decorated text with different alignments can be taken as input in the future.

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