TOUCHLESS ENGLISH CHARACTER AND DIGIT RECOGNITION USING NEURAL NETWORK

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Abstract

Touchless is the new way to write and recognize English character, it has been proposed in this paper. It is named as touchless written English character recognizer (TER). The input to system is given in touchless fashion i.e in front of webcam by sensing specific colour object with moving hand tracking is done. Then this input is recognized by Artificial Neural Network (ANN). The TER can further be used to write and recognize English word and sentences by adding character one by one to text editor. It is replacing our traditional input devices such as mouse or keyboard. For touchless writing this proposed TER has been applied in different forms for recognizing 26 English characters and 10 English digits. For disabled person TER is helpful.

Keywords: Artificial Neural Network, Touchless Written English Character Recognizer.

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1. INTRODUCTION

Touchless Writer is a new way of interaction between computers and human beings. The user enters the character into the computer without the use of keyboard or on-screen keyboard or any other input device. This is done through a webcam by using a pointed coloured marker. The entered character is recognized by the touchless writer and displayed on the screen. In this way touchless writer provides convenient and comfortable way of entering characters into the system.

Our goal is to create new generation of human computer interaction eliminates the use of touch and enables a touchless interaction between humans and computers. As the technological development has brought a significant and fundamental change in the computers resulting in cheaper and smaller devices, Touchless writer is one of such significant development that provides humans the comfort and convenience to enter the character into computers without even touch. Previously handwritten English character recognition has been done [1],[2], none of them are touchless writing. i.e in the existing system the writing is done by using pen or pencil on the white paper.

2. EXISTING SYSTEM

In the recent year for easily accessing different computer application. The existing system includes methods like Support Vector Machine and Principal Component Analysis for character recognition. All these methods are touch based character methods.

For the character recognition has become an acute research area to easily accessing different computer application. The number of ways have been proposed for the character recognition and considerable have been successfully reported. In existing system the character recognition technique enables a computer to receive and interpret intelligible handwritten input from sources such as papers, documents, touch-screens or pictures. Herein, the feature extraction is done where it classify unknown handwritten character into one of the known classes. Up to this it was tedious task to machine for recognition human handwriting with efficient accuracy, specially under different criteria such as forms of writing, variable sizes, and different patterns for different people etc. for recognizing the handwritten characters of different languages, usually the existing way to take inputs from source like papers.
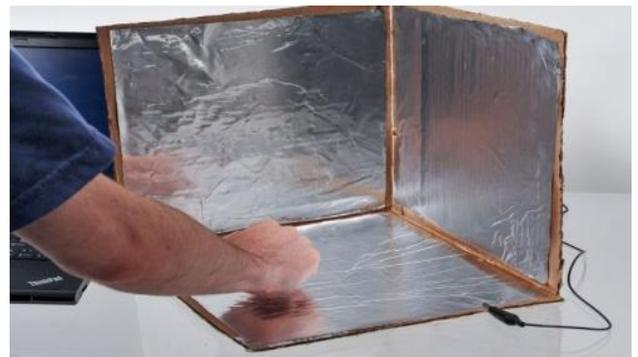

Fig-1: Existing System.

3. PROPOSED SYSTEM

The software provides the interaction with computers by means of tracking pointed coloured marker through a web camera. The user enters the character with the help of pointed colour marker. Through the movement of the marker character is captured and is compared with existing character set. The best possible matching character is displayed on the screen.

Since the proposed system replaces the traditional input devices, it provides ease and comfort to enter character into the system. And it can be used easily used by handicapped people. In case of regular input devices, the typing speed matters and in our software this problem is overcome. In this way the software will be developed through which the data will be entered without the use of regular input devices such as keyboards or on screen keyboards, with more effective way.
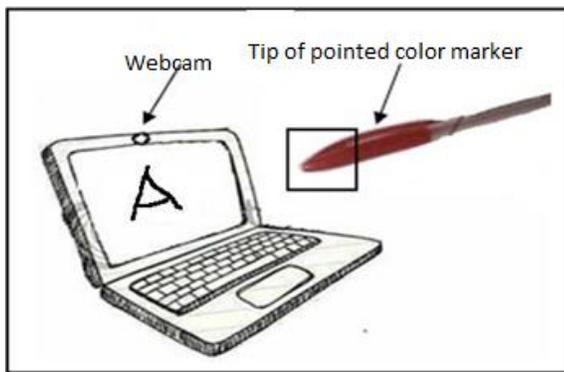
A. TER processing stages:

1. Pre-processing:

Fig-2: Tracking of pointed colour marker.

Fig- 3: Processing of pre-recognized image.

The process starts with the capturing the image of English character tracking through pointed colour marker in front of webcam as shown in figure 2. Here, the tip of finger has been used as a marker. The red colour of the marker head has been kept unique in the environment to ensure uniform tracking, which is usually use to write a character in front of webcam. In figure 2, square area on the head of marker is being tracked and the moving path has been draw as a character shown in figure 3.
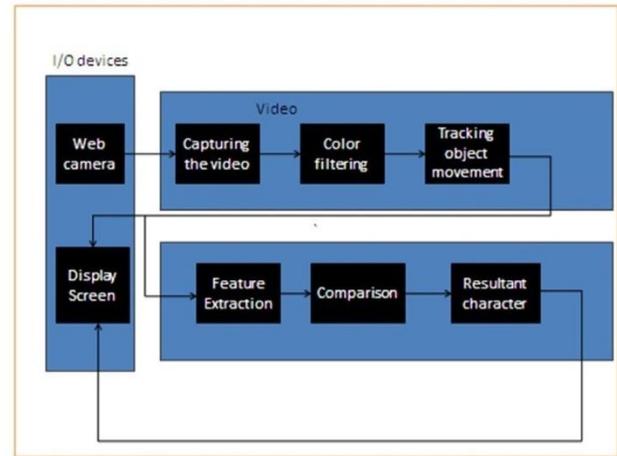

Fig-4: Block diagram of proposed system.

3.1 Algorithm

Different learning algorithms are used to train different neural networks, and are used to solve different problems:

Perceptron Learning[5] - the algorithm may be considered as the first neural network learning algorithm. The algorithm may be used with a one-layer activation network, where each neuron has a threshold activation function. The range of its applications are rather small and limited the with classification of linearly separable data.

Delta Rule Learning[4] - the algorithm is a next step after the perceptron learning algorithm. It utilizes the activation function's derivative, and may be applicable to single-layer activation networks only, where each neuron has a continuous activation function instead of a threshold activation function. The most popular continuous activation function is the unipolar and bipolar sigmoid function. Because the algorithm may be applied to one-layer networks only, it is limited to some classification and recognition tasks mostly.

Back Propagation Learning[6] - this is one of the most popular and known algorithms for multi-layer neural network learning. Initially, it was described in 1974, and from that time, it was extensively studied and applied to a broad range of different

tasks. Because the algorithm is able to train multi-layer neural networks, the range of its applications is very great, and includes such tasks as approximation, prediction, object recognition, etc.

SOM Learning[7] - this algorithm was developed by Kohonen, and may be considered as one of the most famous unsupervised learning algorithms for clusterization problems. It treats neural network as a 2D map of nodes, where each node may represent a separate class. The algorithm organizes a network in such a way, that it becomes possible to find the correlation and similarities between data samples.

Elastic Network Learning - the algorithm is similar to the idea of the SOM learning algorithm, but it treats network neurons not as a 2D map of nodes, but as a ring. During the learning procedure, the ring gets some shape, which represents a solution. One of the most common demonstrations of this learning algorithm is the Travelling Salesman Problem (TSP).

4. ADVANTAGES

1. The application of our system is in order to break the old habits we need to convince user about trying out new habits.
2. The blind person which are having the knowledge about language but are not able to write it in proper way they can use this application.
3. Data is inserted for writing purpose using webcam without use of keyboard or on-screen keyboard by mouse.

5. DISADVANTAGES

If the web cam is not working properly then this application is not useful.

6. CONCLUSION

The proposed system provides a new and easy way of interaction of human beings with computer. Touchless Writer is cost effective since it does not require any expensive hardware. It is useful and more advantageous for those users who cannot use the keyboard properly and users with slow typing speed.

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