

LITERATURE SURVEY ON A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

I. Introduction :

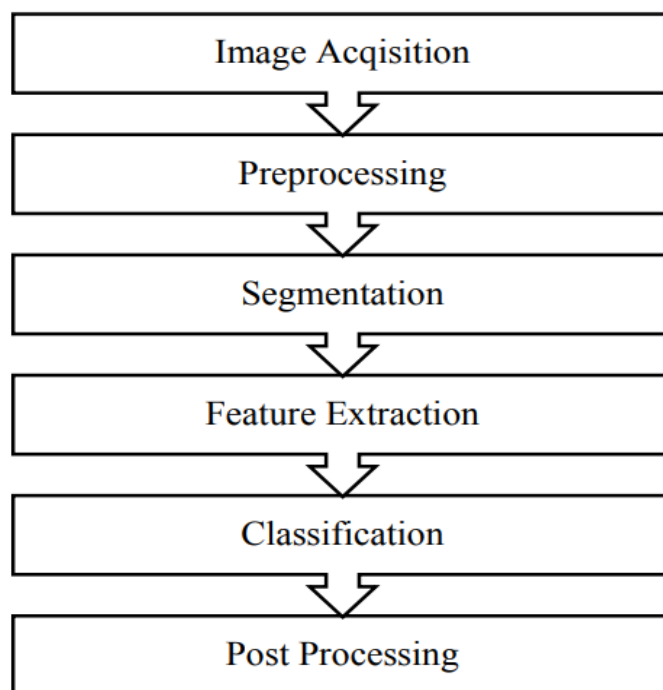
The handwritten digit recognition is the capability of computer applications to recognize the human handwritten digits. It is the hard task for the machine because handwritten digits are not perfect and can have many different shapes and sizes. The handwritten digit recognition is a way to tackle this problem which causes the images of digit and recognizes the digit present in the image.

The handwritten digit recognition is a way to tackle this problem which causes the images of digit and recognizes the digit present in the image. It is the ability of a computer system to recognize the handwritten inputs like digits, characters etc. from a wide variety of sources like emails, papers, images, letters etc. A Convolutional Neural Network or CNN is a Deep Learning algorithm which is very effective in handling image classification tasks. The famous MNIST data set is widely used for this recognition process and it has 70000 handwritten digits. It is a widely used and deeply understood dataset and, for the most part, is “solved.” The MNIST dataset was compiled with images of digits from various scanned documents and then normalized in size.

II. EXISTING SOLUTIONS AND ITS DRAWBACKS

EXISTING SOLUTIONS

1. Ensemble neural networks that combined with ensemble decision tree
2. Digit recognition using single layer neural Network with principal component analysis
3. Recognition using Simple Neural network and back propagation.



DRAWBACKS

- 1.Despite that there are enormous convolutional neural network algorithms proposed for handwritten digit recognition, issues such as recognition accuracy.
2. Get alternative, less likely predictions when available.
- 3.Anyway Higher processor is required.
- 4.High cost
- 5.Time consuming
- 6.computation time still require for further improvement.

3.SOLUTION TO OVERCOME EXISTING DRAWBACKS

- Convolutional Neural Networking (CNN) is being used in many fields like object detection, face recognition, spam detection, image classification.
- Many algorithms have been developed for hand written digit recognition. But due to infinite variation in writing styles they are still not up to mark.
- Poor contrast, image text vagueness, disrupted text stroke, unwanted objects, deformation, disoriented patterns and also inter-class and intra-class similarity also cause mis-classification in handwritten numeral recognition system.

The drawbacks of the existing systems can be overcome by using **CNN algorithm** for training on the Modified National Institute of Standards and Technology (**MNIST**) dataset using OpenCV, a machine learning library written in python can provide an accuracy rate of **99.63%**.

4.APPLICATIONS:

Digit recognition has many applications like

- Number plate
- Postal mail sorting
- Bank check processing
- Form data entry ect....

5.CONCLUSION

Recognition of characters and digits is viral in today's digitized world, especially in organizations that deal with handwritten documents that they need to analyze using computer systems. Convolutional Neural Network gets trained from the real-time data and makes the model very simple by reducing the number of variables and gives relevant accuracy. A comparison on different Machine Learning algorithms like Random Forest Classifier, Convolutional Neural Network, Linear Regression, K-Nearest Neighbors, Support vector machine is done, in which the accuracy for CNN is 99.63%. It can be used to convert books, newspapers and handwritten notes into digital text format using machine learning models.

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PROBLEM STATEMENT:

Following are the constraints faced when computers approach to recognize handwritten digits:

1. The Handwritten digits are not always of the same size, width, orientation and justified to margins as they differ from writing of person to person.
2. The similarity between digits such as 1 and 7, 5 and 6, 3 and 8, 2 and 7 etc. So, classifying between these numbers is also a major problem for computers.
3. The uniqueness and variety in the handwriting of different individuals also influence the formation and appearance of the digits..