

LITERATURE SURVEY ON HAND WRITTEN DIGIT RECOGNITION

S.No	Title	Base Paper Link	Author Name	Content
1.	REVIEW ON HANDWRITTEN DIGIT RECOGNITION	https://www.ijnrd.org/papers/IJNRD1704024.pdf	PRIYA, RAJENDRA SINGH, DR. SONI CHANGLANI	Handwritten Digit Recognition System involves reception and interpretation of handwritten digits by a machine. Due to variation in shape and orientation of handwritten digits, it is difficult for a machine to interpret handwritten digits. Handwritten digit Recognition has a wide area of research due to its vast applications like automatic bank cheques processing, billing and automatic postal service. In this thesis, an Offline Handwritten Digit Recognition System is presented. The recognition system is broadly divided into 2 parts, first part is feature extraction from handwritten images and the second one is classification of feature vector into digits. We propose descriptors for handwritten digit recognition based on Histogram of Oriented Gradient (HOG) feature. It is one of the widely used feature vector for object detection in computer vision. For classification of features, linear Proximal Support Vector Machine Classifier is proposed. This is a binary class classifier which is further converted to a 10-class classifier by means of One against all algorithm. Due to small training time, PSVM classifier is preferable over standard Support Vector Machine (SVM) Classifier. The handwritten images both for training and testing are taken from MNIST database. The performance of the system is measured in terms of Sensitivity, Accuracy, Positive Predictively and Specificity.
2.	HANDWRITTEN DIGIT RECOGNITION	https://www.irjet.net/archives/V9/i6/IRJET-V9I6208.pdf	Dhruv Sharma, Ishaan Singh, Upendra Pandey	The handwritten digit recognition problem becomes one of the most notorious problems in machine” “literacy and computer vision operations. numerous machine literacy ways have been employed to break the handwritten number recognition problem. This paper focuses on Neural Network (NN) approaches. The three most” “popular NN approaches are deep neural network (DNN), deep belief network (DBN) and convolutional neural “network (CNN). In this paper, the three NN approaches are compared and estimated in terms of numerous factors” “similar as delicacy and performance. Recognition delicacy rate and performance, still, isn't the only criterion in the evaluation process, but there are intriguing criteria similar as prosecution time. Random and

				standard dataset of handwritten number have been used for conducting the trials. The results show that among the three NN approaches, DNN is the most accurate algorithm; it has 98.08% accuracy rate. still, the execution time of DNN is similar with the “other two algorithms.
3.	A novel method for Handwritten Digit Recognition with Neural Networks	https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.228.158&rep=rep1&type=pdf	MALOTHU NAGU, N VIJAY SHANKAR, K. ANNAPURNA	Character recognition plays an important role in the modern world. It can solve more complex problems and makes humans' job easier. An example is handwritten character recognition. This is a system widely used in the world to recognize zip code or postal code for mail sorting. There are different techniques that can be used to recognize handwritten characters. Two techniques researched in this paper are Pattern Recognition and Artificial Neural Network (ANN). Both techniques are defined and different methods for each technique is also discussed. Bayesian Decision theory, Nearest Neighbor rule, and Linear Classification or Discrimination is types of methods for Pattern Recognition. Shape recognition, Chinese Character and Handwritten Digit recognition uses Neural Network to recognize them. Neural Network is used to train and identify written digits. After training and testing, the accuracy rate reached 99%. This accuracy rate is very high.
4.	A Literature Survey on Handwritten Character Recognition	http://ijcsit.com/docs/Volume%207/vol7issue1/ijcsit2016070101.pdf	Ayush Purohit, Shardul Singh Chauhan	Handwriting recognition has gained a lot of attention in the field of pattern recognition and machine learning due to its application in various fields. Optical Character Recognition (OCR) and Handwritten Character Recognition (HCR) has specific domain to apply. Various techniques have been proposed to for character recognition in handwriting recognition system. Even though, sufficient studies and papers describes the techniques for converting textual content from a paper document into machine readable form. In coming days, character recognition system might serve as a key factor to create a paperless environment by digitizing and processing existing paper documents. This paper presents a detailed review in the field of Handwritten Character Recognition.
5.	A NOVEL METHOD FOR HAND WRITTEN DIGIT RECOGNITION USING DEEP LEARNING	http://troindia.in/journal/ijcesr/vol6iss6part2/32-36.pdf	Rohini.M , Dr.D.Surendran	Handwritten digit recognition has recently been of very interest among the researchers because of the evolution of various Machine Learning, Deep Learning and Computer Vision algorithms. In this report, we compare the results of some of the most widely used Machine Learning Algorithms like CNN- convolution neural networks and with

				<p>Deep Learning algorithm like multilayer CNN using Keras with Theano and TensorFlow. MNIST is a dataset which is widely used for handwritten digit recognition. The dataset consists of 60,000 training images and 10,000 test images. The artificial neural networks can all most mimic the human brain and are a key ingredient in image processing field. For example, Convolution Neural networks with back propagation for image processing. The applications where these handwritten digits recognition can be used are Banking sector where it can be used to maintain the security pin numbers, it can be also used for blind peoples by using sound output.</p>
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