Project ID : PNT2022TMID38743

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Project Title : A Novel Method for Handwritten Digit Recognition System.

Literature Survey

Paper 1 :

Title	: Handwritten Digit Recognition System.
Author	: Shubham Mendapara, Krish Pabani, Yash Paneliya.
Journal	: International journal of scientific research in computer science engineering and information technology.
Year	: october 2021
Methodology	:Convolutional Neural Network, Contrary neurons' receptive fields partly overlap, machine learning model is used to recognize people's handwriting digits.
Scope	:The Handwritten Digit Recognition using Deep learning methods has been implemented. The most widely used Machine learning algorithms CNN has been trained and tested on the MNIST dataset. With extensive testing using the MNIST data, the current function suggests the role of various hyper parameters. We also confirmed that a good adjustment of hyper parameters is important in improving the performance of Convolutional Neural Network. Utilizing this deep learning technique, a high amount of accuracy can be obtained. This model is able to achieve a recognition rate of 98.85% accuracy and is significantly identifying real world images as well. The effect of increasing the number of convolutional layers on CNN structure in the performance of handwritten digital recognition is clearly demonstrated by Experiments.

Paper 2 :

Title	: Recognition of Handwritten Digit using Convolutional Neural Network (CNN)
Author	:Md.Anwar Hossain, Md.Mohon Ali
Journal	:Global journal
Year	**:**May 2019
Methodology	**:**Convolutional Neural Network for digit recognition , Convolution operation, Max pooling operation.
Scope	**:**Here they demonstrate a model which can recognize handwritten digit. Later it can be extended for character recognition and real-time person's handwriting. Handwritten digit recognition is the first step to the vast field of Artificial Intelligence and Computer Vision. As seen from the results of the experiment, CNN proves to be far better than other classifiers. The results can be made more accurate with more convolution layers and more number of hidden neurons. It can completely abolish the need for typing. Digit recognition is an excellent prototype problem for learning about neural networks and it gives a great way to develop more advanced techniques of deep learning.

Paper 3 :

Title	:Machine Learning for Handwriting Recognition.
Author	**:**Preetha S, Afrid I M , Karthik Hebbar P , Nishchay S K.
Journal	**:**International Journal of Computer
Year	**:**2020
Methodology	**:** Convolutional Neural network , Semi Incremental Recognition , Incremental Recognition , Line and word segmentation , Part based Method, Slope and Slant correction method, Ensemble method.
Scope	:Among these methods, highest accuracy is achieved from Convolutional Neural Network (CNN) and the least accuracy is achieved from Slope and Slant Correction method. When the images are trained with CNN, they will achieve good accuracy and this is one of the successful method for hand writing recognition and only disadvantage with this method is that training time of the model is too high because lot of image samples are included. In Zoning method, if zones which are achieved after dividing input image and if the count of these zones are lesser then accuracy will decrease. Main disadvantage of this method is that developers will face lot of problems while segmentation process but this method is too simple for hand writing recognition. This method only sees the Lat and which makes it simple. Hand writing recognition is very challenging because all the individuals have different hand writing and it becomes more complex to detect when these are compared to that of computer.

Paper 4 :

Title	: Review on handwritten digit recognition
Author	**:**Priya, Rajendra singh, dr. Soni changlani.
Journal	**:**International Journal of Novel Research and Development.
Year	**:**april 2017
Methodology	**:**Hand printed symbol recognition, OCR for cursive Handwriting, Recognition of handwritten numerals based upon fuzzy model, Combining decision of multiple connectionist classifiers for Devanagari numeral Recognition, Binarisation and normalization, Optimization of feature selection for recognition of Arabic characters.
Scope	**:** The paper discusses in detail all advances in the area of handwritten character recognition. The most accurate solution provided in this area directly or indirectly depends upon the quality as well as the nature of the material to be read. Various techniques have been described in this paper for character recognition in handwriting recognition system. A sort comparison is shown between the different methods proposed. This thesis HOG-PSVM handwritten digit recognition system is presented. The images of handwritten digits are described in terms of 81 dimensions HOG feature descriptor.

Paper 5 :

Title	**:**Handwritten digit recognition.
Author	**:**Dhruv Sharma, Ishaan Singh, Upendra Pandey.
Journal	**:**International Research Journal of Engineering and Technology.
Year	**:Jun 2022**
Methodology	**:**Convolutional Neural Network (CNN), Machine Learning, MNIST Dataset.
Scope	**:**The Handwritten number Recognition using Deep learning algorithm has been enforced. The most extensively used Machine learning algorithms, KNN, CNN have been trained and tested on the same data in order acquire the comparison between the classifiers. Utilising these deep learning ways, a high quantum of delicacy can be attained. Compared to other exploration styles, this system focuses on which classifier works more by perfecting the delicacy of bracket models by further than 99. Using Keras as backend and Tensorflow as the software, a CNN model is suitable to give delicacy of about 98.72 Problematic dyads of integers have analogous profile as can be seen from results table; ‘ 4 ’ and ‘ 1 ’, ‘ 7 ’ and ‘ 1 ’,‘ 6 ’ and ‘ 8 ’.Writing styles matter(weird 7's or deficient bottoms).