Real-Time Communication System Powered By AI For Specially Abled

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GitHub Link: https://github.com/IBM-EPBL/IBM-Project-12041-1659367827

Literature Survey

A Novel Method for Handwritten Digit Recognition

1). Handwritten text recognition is one of the significant areas of research and development with a streaming number of possibilities that could be attained. Handwriting recognition (HWR), also known as Handwritten Text Recognition (HTR), is the ability of a computer to receive and interpret intelligible handwritten input from sources such as paper documents, photographs, touch-screens and other devices.

2). Neural Networks have really created a new vision in the computer and industrial applications. Previously mat lab was used for such simulations but in such implementations, one does not have full control, nor the ability to understand that what is happening behind the application. However, with more understanding of neural networks, now we have more control over its applications and now we can easily implement such intelligence to identify objects into machines and computers in order to cater our needs in the industrial applications.

3). The main objective of this investigation is to find a representation of isolated handwritten digits that allow their effective recognition. In this paper used different machine learning algorithm for recognition of handwritten numerals. In any recognition process, the important problem is to address the feature extraction and correct classification approaches. The proposed algorithm tries to address both the factors and well in terms of accuracy and time complexity. The overall highest accuracy 90.37% is achieved in the recognition process by Multilayer Perceptron. This work is carried out as an initial attempt, and the aim of this is to facilitate for the recognition of handwritten numeral without using any standard classification Technique.

4). A Multi-Layer Perceptron (MLP) Neural Network was implemented to address the handwritten digit recognition problem. The proposed neural network was trained and tested on a data set attained from MNIST. The system performance was observed by varying the number of hidden units and the number of iterations. A neural network architecture with hidden neurons 25 and maximum number of iterations 250 were found to provide the optimal parameters to the problem. The proposed system was proved efficient with an overall training.

5). Recognition of characters and digits is vital in today's digitized world, especially in organizations that deal with Handwriting documents that they need to analyze using computer systems. Systems that are used for classification and recognition of handwriting help organizations and individuals to solve complex tasks. The current system used neural networks to process and read handwriting characters and digits. The system benefited from Convolution Neural Networks (CNN) with the help of training data that allowed easy recognition of characters and digits.

6). Like the human visual system, CNN allowed the OCR system to be more sensitive to different features of objects. That way, it was easy to classify and recognize different Handwriting characters and digits based on the training data stored in the system's database. The phases of handwriting recognition included image acquisition, digitization, preprocessing, segmentation, feature extraction, and recognition. The system was tested using unit testing, integration testing, GUI testing, and validation testing.

7). We looked at different classifiers used with different features and parametric values performing with various accuracy and error rate. Classifiers as k nearest neighbors (KNN), proximal support vector machine, and neural network with different layers can perform well, but best performing classifier on MNIST data set is convolution neural network (part of deep learning) and the performance is best in this classifier.

8). We have also performed handwritten digit recognition with the help of MNIST datasets using Support Vector Machines (SVM), Multi-Layer Perceptron (MLP) and Convolution Neural Network (CNN) models. Our main objective is to compare the accuracy of the models stated above along with their execution time to get the best possible model for digit recognition.