V.S.B. ENGINEERING COLLEGE, KARUR

Department of Electronics and Communication Engineering

IBM NALAIYA THIRAN

IDEATION PROCESS

TITLE **:** A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

DOMAIN NAME **:** Artificial Intelligence

LEADER NAME **:** ANUSUYA R

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MENTOR NAME **:** VALLISUSEELA R

IDEAS:

- A technique for off-line handwritten digit recognition. Writer independent handwriting recognition systems are limited in their accuracy, primarily due the large variations in writing styles of most digits. Automatic handwritten digit recognition is remains a challenging problem even with the proficient improvement in the classifier. Various research system or application develop of digit recognition in English have been available but still recognition rate of handwritten digits is poor and is an open problem. Handwritten digits Recognition system consists of a number of phases which are pre-processing, feature extraction, classification and pursued by the genuine recognition. In this idea we can give the brief review on Data collection, Pre-processing, Feature extraction and Classification: Artificial Neural Network and our proposed algorithm of classification MLP and Gradient Descent Adaptive Momentum (GDAM) Algorithm which is effected for escalations of handwritten digit reorganization rate.
- In a computer vision system, handwritten digits recognition is a complex task that is central to a variety of emerging applications. It has been widely used by machine learning and computer vision researchers for implementing practical applications like computerized bank check numbers reading. In this idea, we

will implemented a multi-layer fully connected neural network with one hidden layer for handwritten digits recognition. The testing has been conducted from publicly available MNIST handwritten database. From the MNIST database, we extracted 28,000 digits images for training and 14,000 digits images for performing the test. Our multi-layer artificial neural network has an accuracy of 99.60% with test performance.

- Hand Writing detection is a meadow of research in pattern detection; different people have a different hand writing, so hand Handwriting detection is a difficult task or one of the difficult problems in the field of hand writing detection and also number detection. Still academic research in the field continues, the hub of digit detection has shifted to implementation of confirmed techniques. OCR is one of the best technique for recognition system. OCR basically used in two modes, first one is offline mode and second one if online mode. The endeavour of this paper is to create a new handwritten digit recognition method. In this idea we deal with recognition of inaccessible handwritten gurmukhi digits using Neural Network and Particle Swarm optimization neural network Algorithm
- Handwritten digit recognition is an intricate assignment that is vital for developing applications, in computer vision digit recognition is one of the major applications. There has been a copious exploration done in the Handwritten Digit Recognition utilizing different deep learning models. Deep learning is rapidly increasing in demand due to its resemblance to the human brain. The two major Deep learning algorithms Artificial Neural Network and Convolutional Neural Network which have been compared in this paper considering their feature extraction and classification stages of recognition. The models were trained using categorical cross-entropy loss and ADAM optimizer on the MNIST dataset. Backpropagation along with Gradient Descent is being used to train the networks along with reLU activations in the network which do automatic feature extraction. In neural networks, Convolution Neural Network (ConvNets or Convolutional neural networks) is one of the primary classifiers to do image recognition, image classification tasks in Computer Vision.

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EXPLANATION:

Neural networks are used as a method of deep learning, one of the many subfields of artificial intelligence. They were first proposed around 70 years ago as an attempt at simulating the way the human brain works, though in a much more simplified form. Individual 'neurons' are connected in layers, with weights assigned to determine how the neuron responds when signals are propagated through the network. Previously, neural networks were limited in the number of neurons they were able to simulate, and therefore the complexity of learning they could achieve. But in recent years, due to advancements in hardware development, we have been able to build very deep networks, and train them on enormous datasets to achieve breakthroughs in machine intelligence. These breakthroughs have allowed machines to match and exceed the capabilities of humans at performing certain tasks. One such task is object recognition. Though machines have historically been unable to match human vision, recent advances in deep learning have made it possible to build neural networks which can recognize objects, faces, text, and even emotions. In this method, we will implement a small subsection of object recognition—digit recognition. Using TensorFlow, an open-source Python library developed by the Google Brain labs for deep learning research, you will take hand-drawn images of the numbers 0-9 and build and train a neural network to recognize and predict the correct label for the digit displayed. In this method we won't need prior experience in practical deep learning or TensorFlow. We'll assume some familiarity with machine learning terms and concepts such as training and testing, features and labels, optimization, and evaluation.