**PROPOSED SOLUTION**

**HANDWRITTEN RECOGNITION USING DIGITS**

**PROBLEM STATEMENT:**

Handwritten character recognition (HCR) is a mainstream mobile device input method that has attracted significant research interest. Although previous studies have delivered reasonable recognition accuracy, it remains difficult to directly embed the advanced HCR service into mobile device software and obtain excellent but fast results. Cloud computing is a relatively new online computational resource provider which can satisfy the elastic resource requirements of the advanced HCR service with high-recognition accuracy. However, owing to the delay sensitivity of the character recognition service, the performance loss in the traditional cloud virtualization technology (e.g., kernel-based virtual machine (KVM)) may impair the performance.

**IDEA/SOLUTION DESCRIPTION:**

* Designing an HCR engine based on DCNNs as a demo of the advanced HCR algorithm for high-recognition accuracy in cloud computing
* Using containers to deploy the service in order to reduce the performance loss of the virtualization layer and easily expand the resources under different workloads
* Designing a greedy resource scheduling algorithm based on the performance evaluation in order to improve resource utilization under the QoS guaranteeing

**NOVELTY/UNIQUENESS:**

* Handwritten digit recognition using MNIST dataset is a major project made with the help of neural network. It basically detects the scanned images of handwritten digits.
* We have taken this a step further where are handwritten digit recognition system not only detects the scanned images of handwritten digits but also allows writing digits on the screen with the help of an Integrated GUI for recognition.

**SOCIAL IMPACT/CUSTOMER SATISFACTION**:

Digital Recognition is nothing other than recognizing or identifying digits in any document. The framework of digital recognition is simply the operation of the machine to prepare or interpret digits. Handwritten Digit Recognition is the power of computers to translate handwritten digits from a variety of sources such as text messages, bank checks, papers, photos, etc. method

With the use of in-depth learning methods, human efforts can be reduced in perception, learning, perception and in too many regions. Using in-depth learning, the computer learns to perform distinctive functions in images or content anywhere

accuracy, in addition to the performance of the human level. The digital recognition model uses large data sets to detect digits from different sources.

**BUSINESS MODEL (FINANCIAL BENEFIT):**

* Handwritten digit recognition refers to a model’s (machine’s) capacity to detect any handwritten digits from various sources, such as photographs, papers, and touch displays, and classify them into ten specified categories 0-9.
* Several ways and algorithms are used to recognize handwritten digits, such as Deep Learning/CNN, SVM (Support Vector Machine), Gaussian Naive Bayes, KNN (K-Nearest Neighbour), Decision Trees, Random Forests, etc.
* We used the CNN (Convolutional Neural network) algorithm to recognize handwritten digits in this project.

**SCALABILITY OF SOLUTION:**

* The variations of accuracies for handwritten digit were observed for 15 epochs by varying the hidden layers using CNN model and MNIST digit dataset.
* The maximum accuracy in the performance was found 99.64% and the total lowest test loss is 0.0239 approximately.