A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

PROBLEM DOMAIN:

Hand-written digit cognizance is the capacity of a PC system to apprehend handwritten inputs such as digits, characters, etc. from an extensive variety of sources such as emails, documents, images, letters, etc. This has been a problem of lookup for decades. Some areas of lookup consist of verification of signatures, processing of bank checks, interpretation of postal addresses from envelopes and many extras are turn out to be less difficult and extra handy through digit recognition methods.The project requires a lot of libraries such as primary ML libraries, deep mastering libraries, EDA (Exploratory Data Analysis) and tensor-flow the place tensor-flow is used as backend with keras at some stage in the development process.One of the most regularly occurring and broadly used strategies is Convolution neural networks (CNN's), a kind of neural networks which can extract relevant features robotic-ally from enter information. Here, we will learn about the implementation of well-known MNIST facts set to predict and recognize handwritten digits the use of deep gaining knowledge of techniques and Machine Learning algorithms.

PROJECT BACKGROUND

In generally Handwriting Digits Recognition (HDR) is categorized into six phases which are acquisition of image, pre-processing of enter image, segmentation, feature extraction, classification and put-up processing.

A. Image Acquisition:

The input photo is supplied to the consciousness gadget at the Image Acquisition stage. The input can be either in a photograph layout such as JPEG, BMT, etc., or a scanned image, digital camera, or any other gorgeous digital input machine or can be taken from the canvas on the person interface.The information can be acquired from the input image(data) which is not in accurate.

B. Pre-Processing

The 2nd method, known as pre-processing, is the entry approach for personality cognizance and is very essential in finding out the focus quality. Preprocessing operates to normalize strokes and also to take away deviations that can minimize the accuracy rate. Preprocessing works usually on distinctive distortions such as irregular textual content size, missing points at some point of pen movement, jitters, left — proper bend and uneven spaces.

C. Segmentation

Segmentation is used to transform the enter representation of many characters to the individual characters. The methods used are the segmentation of words, strains and characters.After that, each level, the characters are retrieved by a approach known as histogram, and subsequently they are retrieved.

D. Feature Extraction

The aim of the extraction characteristic is to permit the extraction of the sample that is most important for classification. Some of the Extraction Function techniques such as Principal Component Analysis (PCA), Scale Invariant Feature Extraction (SIFT), Linear Discriminant Analysis (LDA), Histogram, Chain Code (CC), Zoning and Gradient-based applied sciences can also be used to get rid of the traits of character characters.

E. Classification

Decision-making takes vicinity at some point of the classification process. The extracted attributes are used to become aware of the characters. Different classifiers algorithms are used, such as SVM and Neural Networks. The classifiers sort the precise input function with reserved sample and find the best matching input classification for which Soft Max Regression is being used.

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IMPLEMENTION

A. TensorFlow

TensorFlow is used as backend in the application of this project. TensorFlow is a brilliant records circulation in the Machine Learning Library made by means of the Google Brain Team and made open supply in 2015. It is designed to ease the use and greatly relevant to each numeric and neural gadget troubles simply like different spaces. TensorFlow is essentially a low-level math-entangled tool that pursuits experts who apprehend what they're doing to construct exploratory studying structures, play around with them, and turn them into running programs.

B. Python

Python is used for the duration of the implementation of assignment the place several traces of code had been brought in order to accomplish the assignment requirements. Python is typically used globally, and is a high-level programming language.

CONCLUSION

The project of the undertaking is just to create a model which can recognize the digits using MNIST datasets however it can be prolonged to letters and then a person's handwriting. It can be used by countless organization, schools, banks and even for family activities.It is also useful in banking sectors ,postal and vehicle number recognition and lot.