Handwritten Digit Recognition using Machine Learning

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Abstract: *Deep learning is remarkably used in vast ranges of fields because of its diverse range of applications such as surveillance, health, medicine, sports, robotics, drones, etc. In deep learning, Convolutional Neural Network (CNN) is at the Centre of spectacular advances that mixes Artificial Neural Network (ANN) and up to date deep learning strategies. It has been used broadly in pattern recognition, sentence classification, speech recognition, face recognition, text categorization, document analysis, scene, and handwritten digit recognition. The goal of this Project is to observe the variation of accuracy of CNN to classify handwritten digits using various numbers of hidden layers and epochs and to make the comparison between the ac-curacies. For this performance evaluation of CNN, we performed our experiment using Modified National Institute of Standards and Technology (MNIST) datasets. Further, the network is trained using VGG61 model*

Objective

The objective for this project is to create a system that could detect and extract hand written digit from images or scanned documents which can be converted into an editable format with maximum accuracy.

The main objectives of the project are as follows:

• *To design an image classifier model for implementing the handwritten detection algorithm to detect digits.*

• *To make an easy-to-use user interface to predict the handwritten digits.*

• *Evaluate the results from trained model.*

Scope

Data Collection: Gathering a dataset of handwritten digit images is an essential part of developing a machine learning model for digit recognition. This may involve collecting samples from different sources, such as publicly available datasets or creating a custom dataset.

Data Preprocessing: Preprocessing the collected data is crucial to ensure the quality suitability of the dataset for training the model. This step may involve tasks like resizing images, normalizing pixel values, removing noise, and augmenting the dataset through techniques like rotation, scaling, or adding noise

The rapid proliferation of the Internet of Things (IoT) has led to the integration of numerous smart and interconnected devices in various domains. To ensure seamless communication in IoT networks with mobile devices, efficient and adaptive routing protocols are essential. This paper presents a comprehensive study on optimizing routing protocols for IoT networks with mobile devices. We analyze the challenges posed by mobility in IoT networks and propose novel solutions to enhance the performance of routing protocols. The proposed optimizations are evaluated through simulations and real-world experiments, by demonstrating significant improvements in network efficiency, scalability, and reliability

Keywords: Internet of Things

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