Character Recognition Tamil Language in Printed Images using Convolutional Neural Network (CNN) analysis

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Abstract

In this paper, we suggested a system for handwritten character recognition in printed images of the Tamil language. The current work is being implemented using Optical character Recognition (OCR) in step one of the projects. The most recognized issues are poor print and paper quality and unknown font faces. OCR is also not accurate in acknowledging the handwritten text and the fonts. Also, the implementation is carried out using the Convolutional Neural Network (CNN) model with handwritten digit recognition. CNN has the potential to recognize handwritten picture characters clearly and robustly. For Tamil handwritten character classification, we have considered the CNN in this paper without any feature collection. In terms of test accuracy, the proposed approach provides comparable output with the other existing methods. And it was checked on a major data set as well. For Tamil handwritten character recognition, experiments on a large data set showed the robustness of this model. The outcome of the proposed model for handwritten Tamil character recognition using CNN gives an accuracy of 98.00%

Keywords: Convolutional Neural Network, Robustness, Optical character Recognition, Handwritten Character Recognition.

I. Introduction

The area of study in artificial intelligence, machine vision, and pattern recognition is HCR [1]. It is said that a computer performing handwriting recognition will acquire and detect characters and transform them into machine- encoded type in paper papers, photographs, touch-screen devices, and other sources. In OCR and more complex intelligent character recognition systems, its use is sought. Deep learning mechanisms such as neural networks are applied by most of these applications today. The HCR device can play an enormous role in advancing the automation process and, in many implementations, can maximize the relationship between man and machine.

Significant data can be available on documents, it is normally scanned and stored as an image to retain them in digital format, which does not allow the necessary information to be checked and retrieved, where the suggested method can recognize individual characters and secondly the output can be stored in any text format the saves human efforts and time to manually store data in digital format [2].

The proposed device will be used to identify handwritten characters available on bank cheques, government papers, bill payment systems, identification of postcodes, authentication of signatures, readers of passports, and offline identification of documents, which may also be computer protection and forensic examination paper review [3].

Deep learning techniques have been successfully extended to numerous fields in recent years, such as image processing, voice recognition, cancer cell identification, video search, face detection, satellite imaging, traffic sign recognition, and pedestrian detection, etc. The outcome of deep learning methods is also popular, and the outcomes are comparable in some cases to human experts in recent years [4]. To achieve changes in the current outcomes, most of the questions are often re-experimented with deep learning methods.

In recent years, numerous deep learning architectures have been introduced, such as deep Convolutional Neural Networks, deep belief networks, and repetitive neural networks. Recognition of characters is one of the fields where machine learning methods have been thoroughly studied. The first deep learning method, one of the leading techniques of machine learning, was suggested in 1998 for character recognition on the Modified National Institute of Standards and Technology (MNIST) database [5]. A CNN is a form of deep learning that can be used both for feature extraction and classification purposes. A Convolutional Layer is often the first layer within a CNN. It is used for the input image to slide or consolve about. It is used to multiply the values displayed in the philter with the initial image pixel values shown in Figure 1.