
HANDWRITING RECOGNITION-USING MACHINE LEARNING TECHNIQUES

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ABSTRACT

Handwriting Recognition (HWR) is an automated process for converting old handwritten documents into digital form. It is a digital technology that ensures the correction of textual formats accurately. This research paper offers a comprehensive review of developments in HWR and analyzes the challenges and difficulties associated with it.

Keywords: Handwriting Text Recognition (HTR), Optical Character Recognition (OCR), Convolutional Neural Network (CNN).

I. INTRODUCTION

Handwriting Recognition (HWR) is also known as Handwritten Text Recognition (HTR). Handwriting recognition is the important part for digital technology. It is field of research. The capability of a computer to receive and clarify perspicuous handwritten input from paper documents, touch -screens, photography and other devices. In 1950, people began teaching computers to understand handwriting. In 2021, handwriting recognition continued improve. Handwriting Recognition makes it easier for computer to read and understand.

OCR: OCR stands for Optical Character Recognition. OCR is the technique of handwriting recognition. OCR allows you to scan handwritten documents and books, converting them into text with the help of computer. It is used to convert paper documents into digital scans. "When processing documents by hand, it can take twice as long as using handwriting recognition software, also known as Intelligent Character Recognition (ICR)". ICR collects the handwritten characters on daily basis for future reference. However, this recognition has its limitations, as ICR may struggle to recognize cursive handwriting, processing it on a character-by-character basis, which can be confusing for the engine. These techniques are used to automate the extraction of text and data from scanned documents, including PDFs. IWR (Intelligent Word Recognition) takes this a step future by not only recognizing individual words but also understanding their context within a sentence, enabling correction and interpretation of text as a human would. These technologies are incredibly valuable for automating data entry and processing tasks and can significantly Improve efficiency and accuracy in handling large volumes of documents. Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) are common tools in handwriting recognition used for machine learning and deep learning.

Offline Recognition: Offline Handwriting Recognition refers to OCR, is a process that converts the handwritten text into a digital format. Offline recognition is look like computers magical tricks, making it possible for the computer to understand and recognize the handwritten text.

Online Recognition: Online Handwriting Recognition is similar a helpful friend who can understand your writing, even if there are mistakes. It's a technology that translate the dynamic characteristics of your handwritten words into electronic data. This includes details like the direction, velocity, position of your pen. Mainly used for signature verification.

II. LITERATURE REVIEW

In this paper, we will look at the important developments in the literature related handwriting recognition. While reviewing the theories we find out the challenges and difficulties faced in this field. These schallenge are discussed in the existing literature.

Challenges and Difficulties:

1. Variety in writing styles:

Peoples are write the documents in creative, narrative, poetic, technical, journalistic, etc. Recognizing these types of styles can be challenge.

2. Size and styles:

Different writing styles and sizes or fonts in one character can be difficult or complicate to recognize.

3. Smudged and noisy:

Smudged means blurred when pen or ink, pencil marks spread on paper, which can make it challenging to read. The unwanted marks can result from various factors such as shaky or low quality of handwriting.

4. Cursive:

Cursive writing means characters or letters can connect in a flowing manner which can make difficulties.

5. Integration:

Integrating the handwriting recognition into device and application can be a technical challenge.

III. RELATED WORK

In the last decades Handwriting Recognition has significantly improved and has become essential for the analysis of images and text. This technology makes it easy to bring handwritten content into digital form. It represents the character size, shape, direction. It is also used in many applications such as, digitizing notes in form. Convert documents into text.

IV. METHODOLOGY AND RESULT

Handwriting recognition (HWR) helps to expand various languages and scripts globally. We studied the reference paper, previous theories for acknowledgement of handwriting recognition. We used Python and machine learning to create a system. In this research, we first collected the image data and created a dataset of handwritten digits of various patterns. Processing of this image data is done to clear the noise and inconsistencies in the image. We trained the system model to analyze the accuracy of the code. Finally, we recorded the results of the system model.

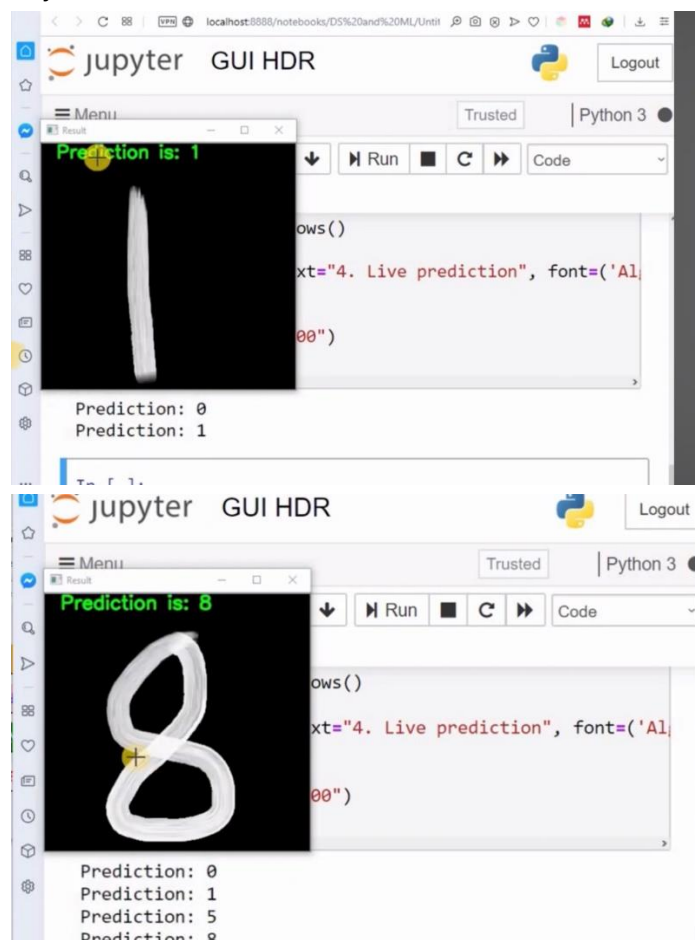


Figure 1: Results

V. CONCLUSION

In this Handwriting Recognition research paper, various techniques have been explored within the field of recognition. The paper discussed the use of machine learning and deep learning methods in this context.

VI. REFERENCES

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