Optical Character Reognition

STC project

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***Abstract*—OCR is one of the most intriguing topics and has a wide range of applications in modern technology. OCR can be useful in a lot of domains such as aid for deaf people, traffic monitoring system, text recognition, text translation, etc. Also, google's latest OCR feature can directly detect and translate text from various languages which seems highly useful for tourists.**

I. Introduction

OCR stands for Optical Character Recognition. It is a widespread technology to recognise text inside images, such as scanned documents and photos. OCR technology is used to convert virtually any kind of images containing written text (typed, handwritten or printed) into machine-readable text data.
OCR Technology became popular in the early 1990s while attempting to digitise historic newspapers. Since then the technology has underwent several improvements. Nowadays solutions deliver near to perfect OCR accuracy. Advanced methods like Zonal OCR are used to automate complex document based workflows.

II. Applications of OCR

In recent years, OCR (Optical Character Recognition) technology has been applied throughout the entire spectrum of industries, revolutionizing the document management process. OCR has enabled scanned documents to become more than just image files, turning into fully searchable documents with text content that is recognized by computers. With the help of OCR, people no longer need to manually retype important documents when entering them into electronic databases. Instead, OCR extracts relevant information and enters it automatically. The result is accurate, efficient information processing in less time.

A. Banking

The uses of OCR vary across different fields. One widely known OCR application is in banking, where OCR is used to process checks without human involvement. A check can be inserted into a machine, the writing on it is scanned instantly, and the correct amount of money is transferred. This technology has nearly been perfected for printed checks, and is fairly accurate for handwritten checks as well, though it occasionally requires manual confirmation. Overall, this reduces wait times in many banks.

B. Healthcare

Healthcare has also seen an increase in the use of OCR technology to process paperwork. Healthcare professionals always have to deal with large volumes of forms for each patient, including insurance forms as well as general health forms. To keep up with all of this information, it is useful to input relevant data into an electronic database that can be accessed as necessary. Form processing tools, powered by OCR, are able to extract information from forms and put it into databases, so that every patient's data is promptly recorded. As a result, healthcare providers can focus on delivering the best possible service to every patient.

C. OCR in Other Industries

OCR is widely used in many other fields, including education, finance, and government agencies. OCR has made countless texts available online, saving money for students and allowing knowledge to be shared. Invoice imaging applications are used in many businesses to keep track of financial records and prevent a backlog of payments from piling up. In government agencies and independent organizations, OCR simplifies data collection and analysis, among other processes. As the technology continues to develop, more and more applications are found for OCR technology, including increased use of handwriting recognition. Furthermore, other technologies related to OCR, such as barcode recognition, are used daily in retail and other industries. To learn more about OCR solutions for your office, you can download a free trial of Maestro Recognition Server, CVISION's OCR toolkit, or request a free trial of Trapeze, our automated form-processing solution.

III. Algorithm and Methodology

1) Start
2) Import character dataset from emnist("letters") library
3) Reshape the data to (n,28,28,1) 4d tensor format to make it compatible with the model
4) Create a sequential model with relu and softmax as the activation functions. Also, flatten, maxpool2D, dense and dropout functions have been added to the neural network.
5) Train the model
6) Evaluate the model
7) Test against other images
8) End

IV. Result Analysis

The Sequential model proved to be an effective tool for image processing which resulted in the desired efficiency and accuracy of the output. The model was tested against the test data set which consisted of10,000 samples of different images that included different text fonts, sizes and backgrounds. The characteristics of the model were as follows with Epochs = 7 :

1) Accuracy : 88.63%
2) Loss : 0.3741
3) Training Time : 37sec

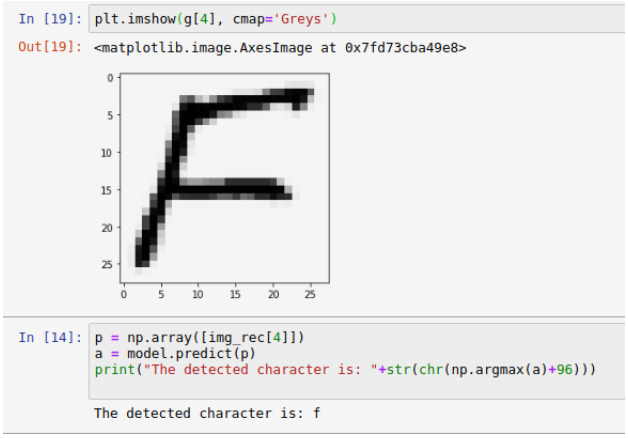

Fig. 1. Testing on images

V. Conclusion

1) If implemented on scale, can reduce a lot of work while acquiring tabulated printed data.
2) Can be used to make a copy of non editable text files to editable text files.
3) If integrated with translated system, can be used to translate foreign written texts.
4) The accuracy can be increased my increasing the train data examples and number of epochs while training.

References

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