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Text Recognition Using Image Processing Technology for Visiting Card

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Abstract: ***Image recognition and optical character recognition technologies have become an integral part of our daily lives due to increasing computing power and the proliferation of scanning devices. A printed document can be quickly converted to a digital text file using optical character recognition and edited by the user. The time required to digitize documents is therefore minimal. This is especially useful when archiving large print volumes. In this study, we show how image processing techniques can be used in combination with optical character recognition to improve recognition accuracy and improve efficiency in extracting text from images. Two of his software systems are developed and tested in this study: a character recognition system applied to cosmetics-related advertising images and a recognition and text recognition system for natural scenes. Experimental results show that the proposed system can accurately recognize text in images.***

Keywords: ***Image processing, Text detection, Visiting card, Optical character recognition (OCR),Named entity recognition (NER),Computer vision, OpenCV, Pytesseract, Tesseract OCR engine, Grayscale conversion, Noise removal, Thresholding, Named entities, Business name extraction, Owner name extraction, Address extraction, Contact number extraction, Email address extraction, Website extraction, Data categorization, Information extraction, Data organization, Spreadsheet integration, Accuracy enhancement, Efficiency improvement, Error reduction, Python programming, Data processing, Data extraction, Text extraction***

I. INTRODUCTION

For a long time there have been attempts to design computer programs that can read printed documents in order to improve the efficiency of archiving by automatically converting documents into electronic files. Systems that can recognize text in images and convert it into characters that can be manipulated on a computer are known as optical character recognition (OCR) systems. OCR was first proposed by the German scientist Tauscheck in 1929. Since the 1960s, researchers around the world have tried to improve its OCR using computers. His early OCR research focused on identifying the digits 0-9. The earliest research on printed kanji recognition was done by Casey and Nagy, who published the first paper on kanji recognition in 1966.

This paper describes his successful identification of 1,000 printed Chinese characters using the template matching technique. This article describes the development of two of his OCR-based systems. One is a character recognition system for commercial advertising images and the other is a text recognition and natural scene recognition system. After completing the basic character recognition system, we will integrate an inappropriate word recognition system to proactively reduce the number of lawsuits arising from inappropriate use of words in advertising. The main purpose of text recognition systems applied to natural scenes is to assist administrators in archiving documents..

II. LITRATURE SURVEY

1) Paper Name: A Novel Method based on Character Segmentation for Slant Chinese Screen-render Text Detection and Recognition. Author: Tianlun Zheng 1, 2, Xiaofeng Wang1, 2,*, Xin Yuan 1,2, and Shiqin Wang 1, Abstract :Screen rendering text has broad application prospects in the fields of medical records, dictionary screen capture, and screen-assisted reading. However, Chinese screen rendering text always has the challenges of small font size and low resolution. Obtaining a screen-rendered text image in a natural scene will have a certain tilt angle. These all pose great challenges for screen text recognition. This paper proposes a method based on character segmentation.

2) Paper Name: Research on Text Detection and Recognition Based on OCR Recognition Technology. Author: Yuming He. Abstract: Image recognition and optical character recognition technologies have be- come an integral part of our everyday life due in part to the ever-increasing power of computing and the ubiquity of scanning devices. Printed documents can be quickly converted into digital text files through optical character recognition and then be edited by the user. Consequently, minimal time is required to digitize documents; this is particularly helpful when archiving volumes of printed materials.

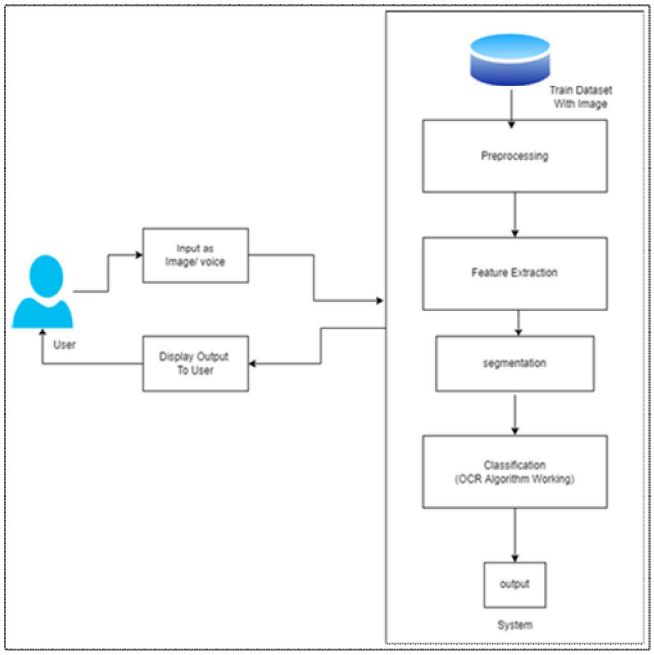
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3) Paper Name: Urdu-Text Detection and Recognition in Natural Scene Images Using Deep LearningAuthor: Urdu text is a cursive script and belongs to a non-Latin family of other cursive scripts like Arabic, Chinese, and Hindi. Urdu text poses a challenge for detection/localization from natural scene images, and consequently recognition of individual ligatures in scene images. In this paper, a methodology is proposed that covers detection, orientation prediction, and recognition of Urdu ligatures in outdoor images

4) Paper Name: Summary of Scene Text Detection and Recognition. Author: Yao Qin1, 2, 3, Zhi Zhang1. Abstract: In recent years, scene text recognition has received much attention, and has a wealth of application scenarios, such as: photo translation, image retrieval, scene understanding and so on. However, the text in the scene is also faced with many problems, such as: light changes, deformation text, text string recognition un- der background noise interference, text skew and degree of curvature, and a large number of artistic fonts. Solving the above problems will always be a challenging thing.

5) Paper Name: Novel Approach for Image Text Recognition and Translation. Author: Srinandan Komanduri , Y. Mohana Roopa , M Madhu Bala. Abstract: One of the most concerned problems of today is to exactly translate the text present in an image to a human readable text. This has been gaining attention these days because of the immense work done by the Computer Vision Community. The main important concept behind this technology is something called as OCR – Optical Character Recognition. With the help of the OCR, we can search and recognize the text in electronic documents and can easily convert them into human readable text.

III.SYSTEM ARCHITECTURE



IV.MODULE EXPLANATION

A. Dataset Preprocessing

Data preprocessing is the process of preparing raw data and fitting it for machine learning models. This is the first critical step in building a machine learning model. When creating machine learning projects, you don't always come across clean and formatted data. It is also necessary to save the data in a clean and formatted way every time you work with it. For this we use a data preprocessing task. Preprocessing is a machine learning term that refers to the transformation of raw features into data that machine learning algorithms can understand and learn from Feature Engineering

B. Feature Extraction

Feature extraction aims to reduce the number of features in a data set by generating new features from existing features and then discarding the original features. This reduced new feature set should summarize most of the information contained in the original feature set. Thus, a condensed version of the original function can be created from the combination of the original set.

C. Classifier Training

In data science, a classifier is a type of machine learning algorithm used to assign class labels to data inputs. An example is an image recognition classifier to label images (eg "car", "truck" or "person"). Classification algorithms are trained using labeled data in an image recognition example, eg a classifier that receives training data to label images. After adequate training, the classifier can take unlabeled images as input and generate classification labels for each image. Classification algorithms use sophisticated mathematical and statistical methods to generate predictions about the probability that a data record will be classified in a certain way. In the image recognition example, the classifier statistically predicts whether the image is likely to be a car, truck, or person, or some other classifier that the classifier was trained to identify

D. Classification

Classification is defined as the process of recognizing, understanding and grouping objects and ideas into predefined categories, also known as 'populations'. Using these pre-classified training datasets, classification in machine learning programs uses a series of algorithms to classify future datasets into appropriate and related categories.

Classification algorithms used in machine learning use input training data for the purpose of predicting the likelihood or probability that subsequent data will fall into one of the predefined categories. One of the most popular classification applications is to filter e-mails into "spam" or "non-spam" as used by major e-mail service providers today.

E. Testing

The process of training an ML model involves supplying the ML algorithm (ie, the learning algorithm) with training data to learn from. The term ML model refers to the model artifact generated by the training process. The training data must contain the correct answer, called the target or target attribute. A training algorithm finds patterns in the training data that map attributes of the input data to a target (the response you want to predict) and builds an ML model that captures those patterns.

V. MOTIVATION

You need several types of images as sources of information for clarification and analysis. When an image is transformed from one form to another, such as digitization, scanning and communication, storage, etc., degradation occurs. Therefore, the output image must undergo a process called image enhancement, which includes a group of methods that try to develop the visual presence of the image. The problem is for the software systems to recognize the characters in the computer system when the information is scanned through the paper documents, as we know that we have a number of business cards that are in printed format related to different topics.

VI. OBJECTIVE OF THE SYSTEM

1) The main purpose of getting a business card is to be able to stay in touch with potential customers and prospects.
2) Helps reduce the time required to store contact information
3) Provides insight into the personalities of various businesses.
4) Attempts to improve classification accuracy using machine learning and real-time Twitter data.

VII. METHODOLOGY

OCR Algorithm:OCR works by dividing the image of a text character into parts and distinguishing between blank and non-blank regions.

OCR stands for "Optical Character Recognition". It is a technology that recognizes text in a digital image. It is commonly used to recognize text in scanned documents and images. OCR software can be used to convert a physical paper document or image into an accessible electronic version with text.

A modern OCR training workflow follows a number of steps:

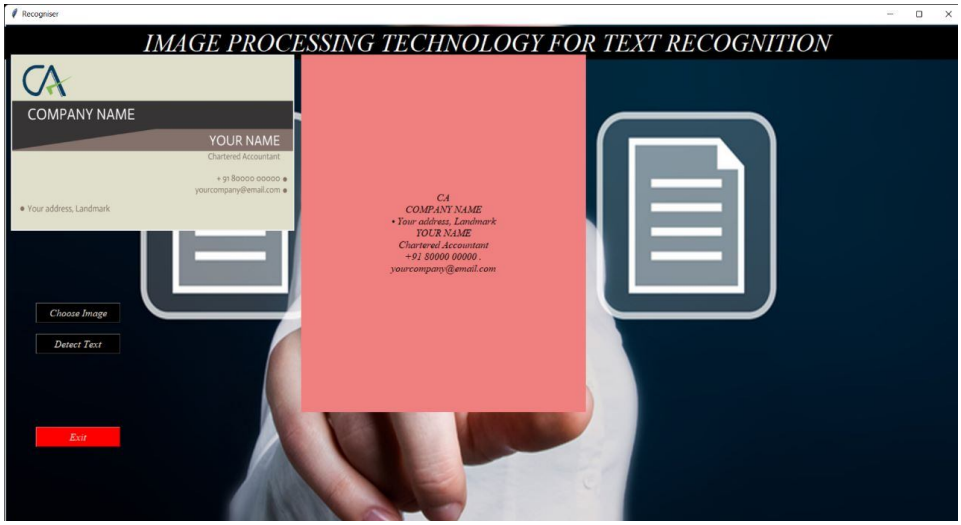
1) Import Image (Visiting Card)
2) Preprocessing.
3) Segmentation and feature extraction.
4) Training.
5) Verification and re-training.

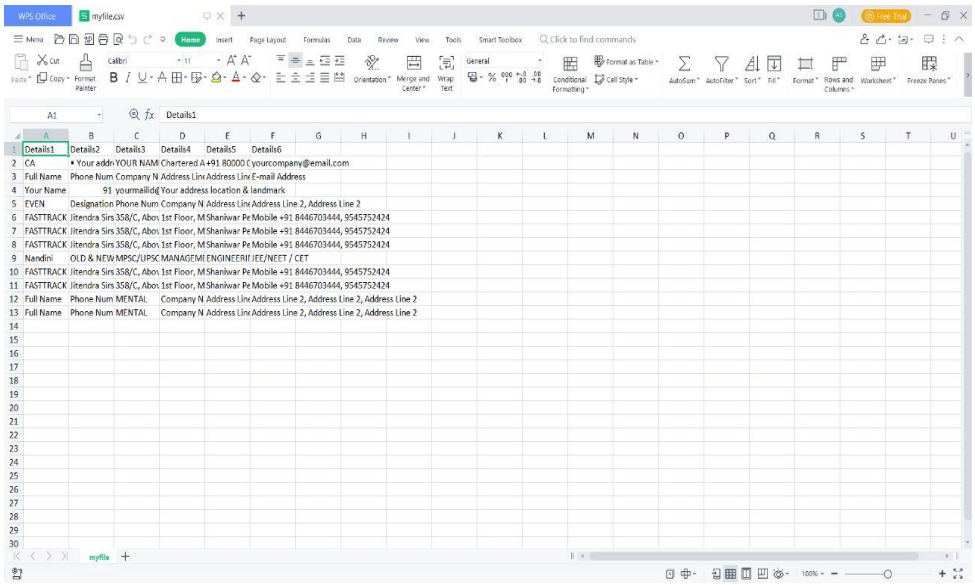
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VIII. DATASET

The dataset contains 1436 images of visiting/business cards. The images consist of business name, owner name, contact number, email address, address. The string data for the cards, and five different categories are same respectively.

IX. RESULTS





X. ADVANTAGES

1) Real time automatic extraction of information from visiting cards.
2) Accurate text classification in various categories.
3) Time Saving.
4) Scalability

XI. LIMITATIONS

1) Only classified English language.
2) Inconsistent Visiting Cards.

XII. APPLICATIONS

1) Business Contact Management
2) Networking Events and Conferences.
3) Personal Contact Management
4) CRM Integration

XIII.CONCLUSION

Image enhancement fundamentally illuminates the interpretability or awareness of information in images for human listeners and provides better input for other automatic image processing systems.
New features can be added to improve recognition accuracy. These algorithms can be tested on a large database of handwritten text. A standard text recognition database needs to be developed. The proposed work can be extended to work on degraded text or broken characters. Recognition of digits in text, half characters and compound characters can be done to improve the speed of word recognition. This extracted text can be further converted to audio, so that the physically disabled, i.e. the blind, can easily understand which text has been converted from the image.

XIV. FUTURE SCOPE

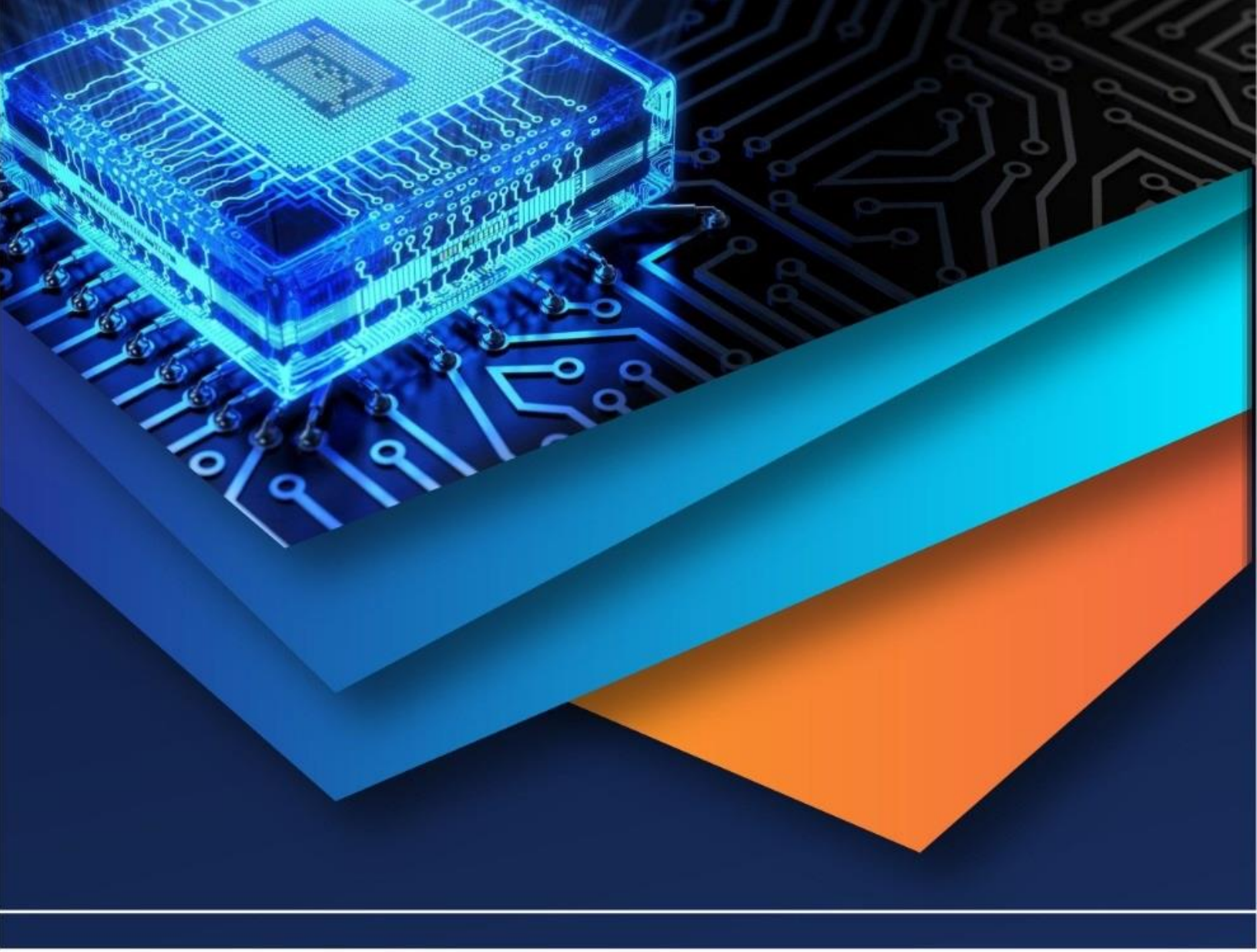
1) Multi-language Support: The project can be extended to support multiple languages.
2) Deep Learning Approach: Exploring deep learning techniques such as CNN, RNN can potentially enhance the image processing and text extraction stages.

XV. ACKNOWLEDGMENT

We would like to express our sincere gratitude to our project supervisor, the team at OpenAI, and the developers of the open-source libraries used. We also thank the researchers in computer vision and OCR for their contributions. Special thanks to the participants who provided visiting cards for testing. Lastly, we appreciate the support of our family, friends, and colleagues throughout the project.

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